

University of Southern Queensland  
Faculty of Engineering and Surveying

# **Management of Road Reconstruction and Repair Following a Flooding Disaster**

A dissertation submitted by

**David William Charles Olm**  
**SN. 0050072411**

In fulfilment of the requirements of

**Courses ENG4111/4112 Research Project**

Towards the degree of

**Bachelor of Engineering (Civil)**  
**And**  
**Bachelor of Business (HR)**

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# Abstract

The project aims to analyse the management response of Toowoomba Regional Council (TRC) to repair and reconstruct the road network system following the flooding disaster of 10 January 2011. The management system for emergent and short-term restoration efforts will be researched and analysed. Issues identified within the system will be discussed and improvements and recommendations will be presented.

All activities performed by a local government are covered by legislation, guidelines, policies and procedures. Thus, accessing the numerous instruments that govern local councils and disaster management constituted an integral part of the research project. In addition, the background of the region, and the organisational structure of the council was researched to establish; a chain of command, authority for councils to carry out their responsibilities, and to determine the management system that TRC had in place for disaster management.

The role and responsibilities of the TRC is described and their emergent response on the day of the disaster is detailed and analysed. The short term recovery phase of this event is also detailed and analysed. Personal interviews with key TRC personnel provided the dissertation with important 'hands on' information regarding the management systems, issues and recommendations.

TRC have completed the emergent works and funding applications within the specified time limits imposed by the authority. The restoration phase is an ongoing process with a specified completion date of 30 June 2013. The management and data entry systems have been described and issues are identified where improvements can be effected.

Lockyer Valley Regional Council's (LVRC's) emergent disaster response is reviewed. This area was subject to substantial loss and damage during the 10<sup>th</sup> of January event. The LVRC's Recovery Plan and interviews with the mayor have provided this project with a very personal view of the disaster and how it affected the Lockyer Valley community. The Queensland Flood Commission of Inquiry Interim Report is used to present the findings of this comprehensive government investigation into the events that occurred.

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I further certify that the work is original and has not been previously submitted for other assessment in any other course or institution, except were specifically stated

David William Charles Olm

SN: 0050072411

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Signature

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Date

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Any large project is not performed in isolation. This project has been completed with the assistance and support of a number of people.

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## Glossary Of Terms

<b>BOM</b>	Bureau of Meteorology
<b>DCC</b>	Disaster Coordination Centre
<b>DERM</b>	Department of Environment and Resource Management
<b>ICA</b>	Insurance Council of Australia
<b>LDMG</b>	Local Disaster Management Group
<b>LDMP 2009</b>	Local Disaster Management Plan 2009
<b>LVCRP 2011</b>	Lockyer Valley Community Recovery Plan 23 February 2011
<b>LVRC</b>	Lockyer Valley Regional Council
<b>LVRC Newsletter 2011</b>	LVRC Newsletter, 28 July 2011, 'Council encourages input into Community Plan'
<b>NDRRA</b>	Natural Disaster Relief and Recovery Arrangement and Natural Disaster Relief and Recovery Determination 2007
<b>NDRRA Determination 2011</b>	Natural Disaster Relief and Recovery Arrangement Determination 2011
<b>NDRRA Guidelines</b>	Queensland Disaster Relief and Recovery Arrangements Guidelines 2009 – 2010, V1.0
<b>QFCI 2011</b>	Queensland Flood Commission of Inquiry Interim Report August 2011
<b>QFCI Lockyer Valley 2011</b>	Queensland Floods Commission of Inquiry; Matters concerning the Lockyer Valley 7 April 2011
<b>QRA</b>	Queensland Reconstruction Authority
<b>QRA Submission Guide 2011</b>	Queensland Reconstruction Authority, Submission Guide Version 3 for NDRRA Funding Applicants
<b>SES</b>	State Emergency Services
<b>SOP 2011</b>	Disaster Coordination Centre Standing Operating Procedures, Doc 3869 103, Ver 4
<b>TMR</b>	Department of Transport and Main Roads Queensland
<b>TNRP</b>	Design Guidelines Transport Network Reconstruction Project
<b>TRC</b>	Toowoomba Regional Council
<b>TRC NDRRA Photo file 2011</b>	Toowoomba Regional Council Natural Disaster Relief and Recovery Agreement Photo file, 2011, Toowoomba Regional Council

# Chapter 1 – Introduction

## 1.1 Introduction

The project aims to analyse the Toowoomba Regional Council (TRC) management response regarding reconstruction and repair of the Toowoomba district road network following a flooding disaster for both emergent and short term restoration efforts, and identifying issues present within the system.

The objectives of the project are summarised in dot points listed below. These objectives outline the features of what will be produced from the project. Refer Appendix A for a full version of the project specification.

- Undertake Literature Review of road maintenance and flooding disaster management
- Review effects of water on sealed roads, and repair methods
- Research TRC current policies and procedures in place to deal with road maintenance and flooding disasters.
- Analyse TRC emergency response, and systems, and short term restoration effort to repair road network
- Research funding strategies of the Natural Disaster Relief and Recovery Arrangement and Queensland Reconstruction Authority
- Review emergency response of Lockyer Valley Regional Council subjected to similar flash flooding damage
- Analyse and evaluate research data with the view to identifying issues present in the current management systems

## 1.2 Rationale

Queensland had been subjected to severe rainfall events and flooding disasters during the “Wet Season” of 2010/2011. South East Queensland, specifically Toowoomba and Lockyer Valley regions, had been among the worst hit by these disasters regarding loss of civil infrastructure, private property and lives. It is largely the responsibility of the government at all levels, federal, state and local, to manage the situation and restore the

affected communities to a pre-disaster state. How well the disaster is managed dictates the time taken for the communities to fully recover. Thus, it is critical for disasters to be managed correctly to prevent further disadvantage to the community, both economically and socially. The severity of the event and the sheer scale of the damage caused has prompted local councils and government bodies to review their disaster management guidelines, procedures and readiness for such an event. This project will focus on the management response of TRC following a flood event regarding reconstruction and repair of the road network system, emergent and short term, and identify issues present within the system.

## **1.3 Content**

### **1.3.1 Background**

A brief background will be presented to provide a contextual basis for the project. The area of Toowoomba, the Darling Downs and the Gowrie Creek catchment will be described. The local governing body, Toowoomba Regional Council (TRC), will be discussed regarding the organisational structure, jurisdiction, and the assets and infrastructure that come under the control of the council. Particular attention is to be given to the role of Council to manage their responsibilities efficiently and effectively in a disaster situation.

### **1.3.2 Literature Review and Research**

A review of the literature relevant to the project topic will be presented. Particular attention is given to the role of local government to act in a disaster situation and provide services and infrastructure that is vital to the safe and efficient operation of the local community. TRC operations are governed by many legislative instruments, guidelines, policies and procedures authored by Federal, State, and Local Government bodies, these will be discussed within the context of the project and where relevant to the TRC. Policies and procedures regarding funding strategies and disaster management will be described. A literature review was performed with a view to analysing the management response of TRC to restore the road network system for emergent and restorative efforts following a flooding disaster. A review of literature concerning Lockyer Valley Regional Council (LVRC) and their emergent response to the disaster that befell the Lockyer Valley on 10 January 2011 will be conducted. Additional information was researched regarding road construction and maintenance. Human

resource management information regarding behaviour, organisational performance management and training was used to assist in the analysis and evaluation section.

### **1.3.3 Toowoomba Regional Council Disaster Management (Role, Response, Analysis and Evaluation)**

A description of the event of 10 January 2011 in the Toowoomba city area will be given followed by a discussion regarding the role and responsibilities of Toowoomba Regional Council in a disaster situation to repair and restore the road network system. Legislation, policies and procedures which give TRC authority to act in a flooding disaster will be described. The TRC emergent response and short term restoration effort to repair the road network system will be discussed. The management systems in place to manage the situations will be described. The information will be analysed and evaluated with a view to identifying if there are any issues within the management system. Recommendations to improve the management systems will be presented.

### **1.3.4 Roads**

The damage caused by the floods that occurred in Toowoomba area and TRC will be described including the infrastructure and road network system that comes under the control of TRC. A basic description of a road will be provided. Typical damage will be described and illustrations of damage will be presented. Generic methods of repair for emergent and short term restoration works will be reviewed. The Transport Network Reconstruction Program (TNRP) Design Guidelines will be discussed. Examples of repair and reconstruction works will be provided. This section is intended to provide the technically based background of a road network system and the techniques used by council in order to render the road network system into a safe and serviceable condition. This section is not intended to be a comprehensive information resource regarding the making of roads.

### **1.3.5 Funding Strategies**

A discussion regarding the funding programs available to local government bodies for emergent and reconstruction works following a natural disaster event will be presented. It will discuss the Natural Disaster Relief and Recovery Arrangement (NDRRA), the Queensland Reconstruction Authority (QRA), the Queensland Disaster Relief and Recovery Arrangement Guidelines 2009-2010 and the Transport Network Reconstruction Program Design Guidelines (TNRP). It will discuss how Toowoomba



Regional Council has applied for funding and the management system used to organise the process of assessing damage and submitting applications to QRA.

### **1.3.6 Review of Lockyer Valley Regional Council Emergent Response**

A review of the Lockyer Valley Regional Council's (LVRC) emergent response to the flash flooding event which occurred on 10 January 2011 will be conducted. A description of the area will be presented and an overview of the LVRC's organisation and structure. A description of the event and typical damage sustained in the Lockyer Valley will be provided. The emergent response of the council will be reviewed. The Queensland Flood Commission of Inquiry findings relevant to the Lockyer Valley situation will be reviewed.

## **1.4 Conclusion**

The aims and objectives of this project are to analyse the management response of TRC to repair and reconstruct the road network system after a flooding disaster. The need for an analysis of this nature became apparent following the wet season of 2010/2011 and the flooding event of 10 January 2011 when a state of disaster was declared. A review of relevant literature was conducted to identify the legislation, procedures and policies that govern disaster management in Queensland. A description of the effects of water on sealed roads is to be provided. TRC role, responsibility and funding strategies during a disaster situation, and their response to the event – emergent and restorative – will be described. An analysis and evaluation of the management system will be presented. A review of the LVRC emergent response to similar flash flooding events will be conducted.

## **Chapter 2 – Background**

### **2.1 Introduction**

The wet season of 2010 & 2011 resulted in more than 78% of Queensland being declared a natural disaster zone. Toowoomba and Lockyer Valley regions were among the worst affected. (QFCI 2011) This project analyses the management of the reconstruction and repair of the Toowoomba Regional Council's (TRC) road network system following the flooding disaster in this period, specifically, the 10<sup>th</sup> January, 2011 event. The project investigation covers both emergent and short term restoration efforts by the TRC to repair the road network to a pre-disaster condition. This chapter will describe the area of Toowoomba, the Darling Downs and the Gowrie Creek catchment area. The local governing body, TRC, will be discussed regarding the organisational structure, jurisdiction, the assets and infrastructure that come under the control of the council.

### **2.2 Toowoomba Region – the Darling Downs**

Toowoomba region covers an area of 12,973 square kilometres in the Darling Downs district southeast Queensland. It is located on the Great Dividing Range of southeast Queensland and the highest point is approximately 700 metres above sea level located at Picnic Point, Toowoomba City. It is in close proximity to Brisbane City, Sunshine Coast and Gold Coast. (Annual Report 2009 – 2010)

The region includes the districts of Cambooya, Clifton, Crow's Nest, Gowrie Junction, Highfields, Kingsthorpe, Meringandan, Millmerran, Oakey, Pittsworth, Toowoomba, Westbrook, Wyreema and Yarraman. The area contains 14 small towns including Toowoomba city. Refer Figure 1 below for a map of the council region. (Annual Report 2009 – 2010)

## TOOWOOMBA REGIONAL COUNCIL AREA



**Figure 1 Map of the Toowoomba Regional Council**

(Source: Annual Report 2009-2010)

This area is the entry point to the mining industry boom area in the “Surat Basin Energy Precinct”. The region is an economic and commercial hub and contributes to the economic development of southern and western Queensland. The estimated Gross Regional Product (GRP) increased by 7.3% to \$7.4 billion as at 2008/2009. This region has a diverse economy involving primary industry, mining, commercial and industry. Unemployment in this area is low being 3.1% less than Australian average of 5.6% unemployment rate. (Annual Report 2009 – 2010)

The region has a combined population of approximately 162,057 people with 313,000 visitors holidaying in the region each year and 1,039,000 staying overnight in the area. (Annual Report 2009-2010)

Specific populations of each area are approximately as follows. Refer Appendix B for regional demographic and population statistics for 2006.

**Table 1 Population Distribution of TRC as at 2006**

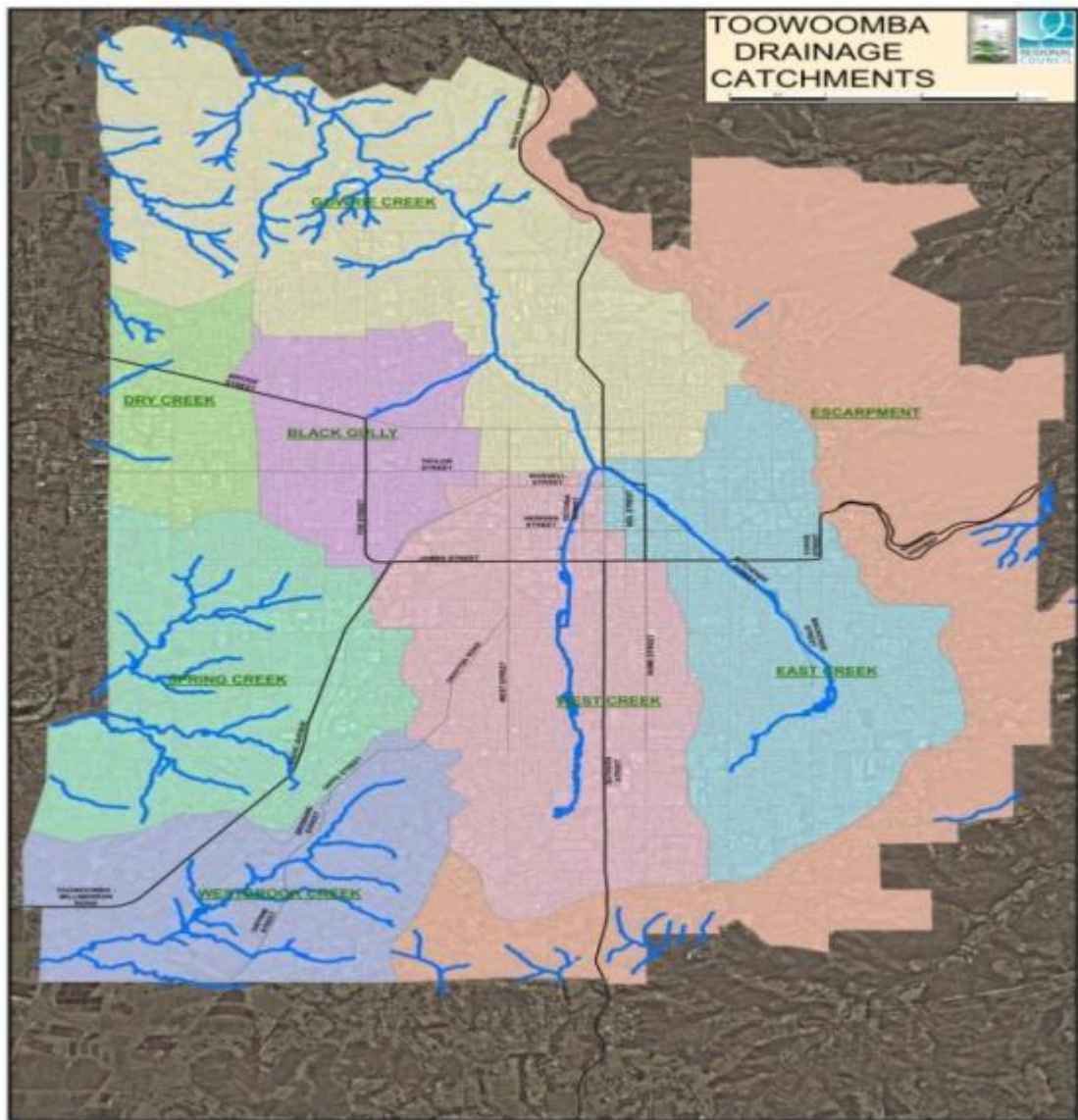
<b>Town</b>	<b>Population</b>
Cambooya	4,666
Clifton	2,928
Crow's Nest	1,712
Gowrie Junction	1,417
Highfields	6,528
Kingsthorpe	1,472
Meringandan	1,473
Millmerran	1,223
Oakey	4,666
Pittsworth	2,928
Toowoomba	117,626
Westbrook	2,289
Wyreema	1,020
Yarraman	1,349

(Adapted: Regional Demographic and Population Statistics 2006)

### **2.3 Toowoomba City**

Toowoomba City is one of Australia's largest inland cities located about 128 kilometres west of the capital city of Brisbane. Toowoomba city is located at the junction of three major highways – the Warrego, New England, and Gore Highways – which connect the Darling Downs area to all parts of Australia. Toowoomba city itself is situated on the western side of the Great Dividing Range at an altitude of approximately 700 meters above sea level. The population of Toowoomba city is approximately 128,000. Toowoomba City is known as the Garden City because of the annual Carnival of Flowers event in September which attracts many visitors to the region. (Annual Report 2009 – 2010)

Toowoomba City has two creek systems running through the town. East Creek starts in the Gabbinbar Ramsay Street area and runs northward towards the central business district of Toowoomba meeting West Creek near Russell Street and the Railway Station. West Creek starts at Kearney Springs near the University of Southern Queensland and runs northward towards the central business district to meet East Creek. These creeks then form Gowrie Creek which eventually merges with Oakey Creek and with the Condamine River. (Annual Report 2009-2010)



**Figure 2 Map of Toowoomba City and Catchment**

(Sourced: McIver 2011)

Toowoomba city and the region sustained massive damage on 10 January 2011. High levels of antecedent rainfall over the region during December 2010 and early January 2011 created saturated conditions in the catchment area. During December 2010 a rainfall of up to 544mm was recorded in Toowoomba region and more rainfall of up to 55mm was recorded in Toowoomba up to 6 January 2011. This rainfall caused localised flooding in the areas of Millmerran, Yarraman, Cecil Plains and Tummaville. (QFCI 2011)

Toowoomba's water supply dams of Cooby, Perseverance and Cressbrook Dams went from extremely low levels to being 53.2% full in December 2010 and rose to 75.2% by 9 January 2011 and by 10 January the dam levels were 127.2% full. (QFCI 2011)

On the 10 January 2011 the Bureau of Meteorology had been tracking a storm system crossing the coast of Queensland. By about 1pm to 2.30pm it began to rain over Toowoomba city and very high levels of rain fell in a short amount of time. The deluge fell on the Great Dividing Range area dropping rain on both the eastern and western watersheds. The rain that fell on the eastern side of the Range flowed into the tributaries of the Lockyer Creek. The rain that fell to the west flowed into East, West, and Gowrie systems. As the water flowed down East and West Creeks and into Gowrie Creek in the middle of the CBD of Toowoomba severe flash flooding occurred. (QFCI 2011) Refer Appendix C for further images of movement of storm cell during the 10 January 2011.



**Figure 3 Radar Image of Storm Cell over Toowoomba**

(Sourced: BOM 2011)

## **2.4 Toowoomba Regional Council**

*“ The Toowoomba Regional Council area is vibrant, culturally diverse, environmentally rich, and economically dynamic region that embraces the future while respecting the past.”*  
*(Annual Report p1, 2009-2010)*

TRC is the local government body responsible for the Toowoomba regional area. It is given authority to govern and control the local area by government legislations such as

the Local Government Act 2009 and the Disaster Management Act 2003 to ensure a safe and effective community. (Annual Report 2009 – 2010)

Of seventy-four local government councils in Queensland TRC is the ninth largest in populations. TRC main council offices are located in Ruthven and Herries Streets in the central business district of Toowoomba city. There are eight service centres throughout the region located in the towns at the buildings occupied by the local council that existed before amalgamation occurred. (Annual Report 2009 – 2010)

TRC owns \$3.2 billion worth of assets and operates a budget of \$490.3 million, consisting of \$2418.2 million in operational expenditure and \$265.5 million in capital expenditure. TRC draws rates from 65,552 properties. (Annual Report 2009 – 2010)

Toowoomba region has 9,650 kilometres of road network systems which are the responsibility of either the TRC or Department of Transport and Main Roads.

During the financial year of 2009/2010 TRC completed \$5.6 million worth of contract work for the Department of Main Roads. TRC is responsible for 3,387 ha of parks and reserves. (Annual Report 2009 – 2010)

Water supply assets include treated bores with a capacity of 4,503 ML, and dams with a capacity of 65,552 ML. Toowoomba's water supply is stored in dams at Cooby, Perseverance and Cressbrook Dams. Toowoomba wastewater treatment plant has a discharge capacity of 7,761 ML of which 2,062 ML is recycled into industry. (Annual Report 2009 – 2010)

## **2.5 Amalgamation of Councils**

During 2008 local government councils were merged by government act into larger local government bodies. TRC is currently in Phase One of the amalgamation process and during the 2009/2010 financial year TRC ended the transitional stage of consolidating the areas into one single unit. (Annual Report 2009 – 2010)

A unified regional plan has been developed from the eight town plans existing before the amalgamation occurred. TRC has now started Phase Two which aims to fully integrate the internal operations and service delivery of all areas. (Annual Report 2009 – 2010)

The first stage of Phase Two was implemented in March 2011 and integrated a single customer service model which aims to redefine the service delivery approach and streamline public access. A new functional structure aiming towards a simpler organisational system has been integrated into major areas of business. A new customer service centre has been opened in Little Street, Toowoomba, and is designed to handle initial customer service contact for TRC. Service delivery and efficiency were a top priority for TRC and staff were instructed that if individuals have a role or duty to perform it was to continue until the Customer Service Centre performed the role. (Annual Report 2009 – 2010)

TRC has been going through a process of unifying bylaws and management systems of the pre-existing councils which were amalgamated into the TRC. King & Company, solicitors, have been appointed to assist in this process. (Annual Report 2009 – 2010)

It has been a major task to develop, compile and maintain a single information, knowledge and management system from the different systems in place throughout the previous eight councils. The restructure has affected the management of all departments including road reconstruction and repair and disaster management. The goal of TRC is to maintain sound financial management and procurement practices while amalgamation is proceeding. (Annual Report 2009 – 2010) The management of disaster events has also been undergoing change with amendment to the Disaster Management Act. From about 2009 local governments have been given more detailed responsibilities to manage disaster events in their local areas and to maintain comprehensive management systems. (QFCI Lockyer Valley 2011) TRC has instigated proactive early intervention workplace health and safety strategies across council. These management processes have increased work place health and safety effectiveness resulting in a reduction of insurance premium rates. (Annual Report 2009 – 2010)

For the amalgamation process to proceed, TRC is currently reviewing policies, standards, codes and other legal requirements. TRC is reviewing the 450 policies and 52 procedures from the former eight council districts. 180 policies and procedures have been made redundant, 270 policies and procedures were still current but 50% will be superseded. TRC hopes to have only 135 policies and procedures of which 34 have



already been approved, 81 have been drafted and 20 have been started. Of the 81 drafts, 49 have been completed and are awaiting approval. In February 2010 TRC decided to adopt the Department of Infrastructure and Planning's model for local laws and subordinate local laws were to be developed at a later date by TRC. TRC has 185 local laws and 126 subordinate laws. (Annual Report 2009 – 2010)

## **2.6 Current Elected Officials**

The organisational structure and personnel flow chart is now provided to illustrate an authoritative chain of command and therefore responsibility regarding decision making and ultimately repair of road network systems following a flooding disaster. TRC has an elected governing body elected in the elections of 2008 consisting of the Mayor and 10 other councillors representing all the areas included in the TRC region. Each councillor is responsible for a specific portfolio and Councillor Carol Taylor is responsible for the Engineering Services portfolio. (Annual Report 2009 – 2010)

## **2.7 Organisation Structure**

The Chief Executive Officer (CEO) of TRC is Mr Ken Gouldthorp, with the departments of:

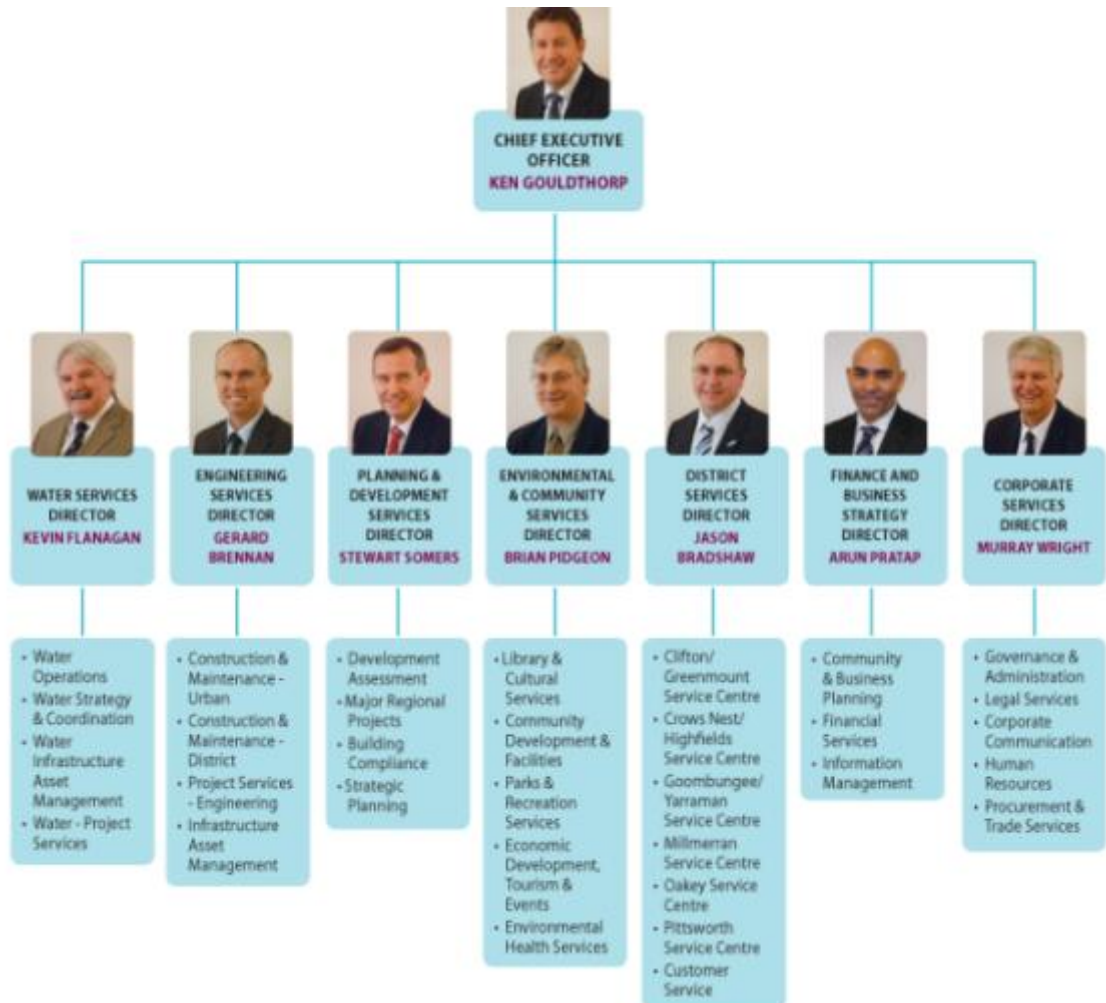
- Finance and Business Strategy,
- Planning and Development,
- Water and Wastewater Services,
- Environmental and Community Services,
- Engineering Services, Corporate Services, and
- District Services,

operating as at completion of the 2009/2010 Annual Report.

At the time of the 2010/2011 wet season the authoritative chain of command for road restoration was as follows:

- Chief Executive Office
- Engineering Services
- Construction Maintenance – Urban,
- Construction Maintenance – District,
- Project Services – Engineering, and
- Infrastructure Asset Management.

The flow chart below illustrates the organisational structure of TRC showing the CEO as the head of the organisation, departments and their associated portfolio sub-departments. These department titles and functions are in the process of change because of the functional restructure necessary as a result of the amalgamation of councils.



**Figure 4 Flow Chart of Organisational Structure as at 2010/2011**

(Sourced: Annual Report 2009-2010)

## 2.8 Local Disaster Management Group

Local Disaster Management Group (LDMG) is set up under Section 33 of the Disaster Management Act 2003. The group consists of 18 members with participants coming from TRC and other emergency services such as police, fire, ambulance and SES. See Table 2 below. (LDMP 2009)

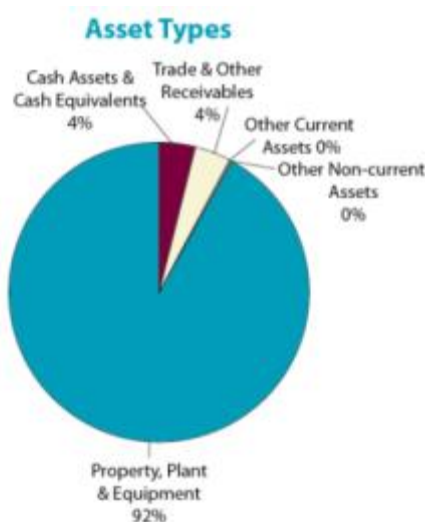
**Table 2 Local Disaster Management Group Membership (LDMP 2009)**

Ser	Member	Organisation	Position
1	Chairperson	TRC	TRC Councillor
2	Deputy Chairperson	TRC	TRC Councillor
3	Executive Officer	TRC	Manager Community & Business Planning
4	Member	TRC	CEO TRC
5	Member	TRC	Director Engineering Services
6	Member	TRC	Manager Environmental Health Services
7	Member	TRC	Manager Corporate Communications
8	Member	TRC	Director District Services
9	Member	EMQ	Area Director
10	Member	QAS	Area Director
11	Member	QFRS	Superintendent Area One
12	Member	QFRS (Rural)	Area Manager
13	Member	QPS Service	OIC Toowoomba Police Division
14	Member	TRC	DM Coordinator / SES Local Controller
15	Member	Ergon Energy	Area Operations Manager
16	Member	QLD Health Services	Director Emergency Department
17	Member	Telstra	Business Development
18	Member	Lifeline	Chairperson Toowoomba Welfare Committee

(Sourced from: LDMP 2009)

## 2.9 Toowoomba Regional Council Assets and Infrastructure

TRC assets and infrastructure make up the majority of council's fixed assets. These are in the form of property, plant and equipment, the majority of which is infrastructure such as roads, drainage, water and wastewater facilities. These form 92% of the council asset base. The total wealth of TRC as at 30 June 2010 was \$3.2 billion.

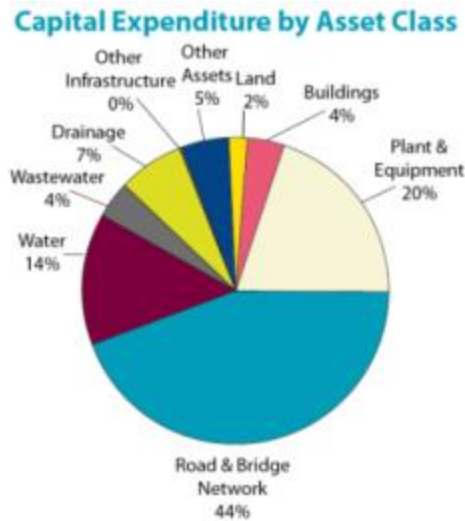


**Figure 5 TRC Asset Types**

(Sourced: Annual Report 2009-2010)

TRC is committed to maintaining, improving, upgrading and constructing infrastructure to provide well maintained infrastructure and services for the people of the region. For

the financial year of 2009/2010 \$59.2 million was spent on assets and infrastructure within the TRC area.



**Figure 6 TRC Capital Expenditure by Asset Class**

(Sourced: Annual Report 2009-2010)

TRC is committed to providing the community with a well planned and integrated transport network system. TRC region covers an area of 12,973 square kilometres. TRC controls 9,650 kilometres of roads of which 3,329.6 kilometres are sealed, 3,022.5 kilometres are gravel roads and 430.3 kilometres are formed roads. TRC also controls 2,868 kilometres of unformed roads.

TRC recognises that the area is an important link in the national, state, regional and local transport system. The Toowoomba By-pass has been identified as a very important project by the Council of Mayors to be constructed as soon as possible to promote the growth of the region. The Toowoomba Aerodrome upgrade is in the planning and construction process. TRC has a program to include ongoing development of walking and cycling pathways. There is a continuing emphasis on improvement of the safety and serviceability of the region's road network system. \$7.2million dollars has been spent on the Regional Reseal Program - a program to reseal country roads. (Annual Report 2009-2010)

The wet season of December 2010 caused localised flash flooding and damage to TRC assets and infrastructure and the TRC was already on alert. The event of Monday, 10 January 2011 caused massive damage to an area already suffering from an unusually wet season. The storm that fell over the region this day was the beginning of an event

of such proportions that it triggered a State inquiry that resulted in the Queensland Flood Commission of Inquiry 2011.

## **2.10 Conclusion**

Toowoomba Region is located in the Darling Downs district of South-east Queensland at the connecting junction of three major highways – the Warrego, the New England and the Gore Highways. The region is governed by the TRC and includes eight districts and fourteen towns including the city of Toowoomba. The catchment area of Toowoomba includes the creek systems of East, West, Gowrie and Oakey Creeks which eventually flow into the Condamine River system. This area had received unusually high rainfall during the month of December 2010 and during the early weeks of January 2011 the area received more rainfall which culminated in a massive storm cell raining over Toowoomba on Monday 10 January 2011. This event resulted in massive flash flooding throughout Toowoomba city, the TRC area and the Lockyer Valley area. The TRC is controlled by an elected body of Mayor and councillors, and the CEO and staff. TRC owns and controls \$3.2 billion dollars worth of assets and infrastructure which includes the assets and infrastructure of the road network system. TRC actively pursues a policy of well planned integrated management systems to manage, control and deliver services including the road network system to the community. TRC has a Local Disaster Management Group and a Local Disaster Management Plan in place. On the day of the disaster event of Monday 10 January 2011 the road network system sustained severe damage. The events of the 2010/2011 wet season were of such proportions that the Queensland Flood Commission of Inquiry 2011 was commissioned to investigate the event.

## **Chapter 3 – Literature Review**

### **3.1 Introduction**

TRC operations are governed by many legislative instruments, guidelines, policies and procedures, disaster management and funding programs authored by Federal, State, and Local Government bodies. Local government provides the services and infrastructure that is vital to the safe and efficient operation of the local community. Particular attention is to be given to the role of Council to carry out their responsibilities efficiently and effectively in a disaster situation. The council has to abide by the legislative constraints and also satisfy the community expectations regarding supply of services and infrastructure. Legislation, guideline, policies and procedures were researched with a view to analysing the management response of TRC to restore the road network system for emergent and restorative efforts following a flooding disaster. A review of literature concerning Lockyer Valley Regional Council (LVRC) and their emergent response to the disaster that befell the Lockyer Valley on 10 January 2011 will be conducted. Additional information was researched regarding road construction and maintenance. Human resource management literature was accessed to assist with the analysis and evaluation of the research material.

### **3.2 Limitations and Difficulties**

Some limitations and difficulties were experienced regarding accessing and researching information about disaster management. Some literature, information and resources were continually being updated and changed because of the Flood Inquiry and continual development of disaster management systems. Difficulty was experienced in analysing a situation that is “happening at the moment”. For examples documents sourced in May 2011 were by Aug/Sept 2011 outdated, links and web sites accessed in May had been changed by August/September 2011. This information had to be sourced again for accuracy and this process became time consuming. It was decided to cite literature when sourced at a certain point in time to facilitate the analysis and evaluation process.

Every aspect of local government is controlled by legislation and it was considered that a detailed description of these relevant sections was necessary to fully explain the complexities of local government and disaster management. It is noted that this document is not intended to be a definitive study of legislative documents and only sections relevant to this project were studied.

The majority of this project research information was based on government legislation and documents. These sources are available via Internet, public and university libraries, agency offices and the Government Printer. Internet sources proved to be the most available, convenient and up to date sources.

### **3.3 Federal – Australian Government**

#### **3.3.1 Natural Disaster Relief and Recovery Arrangement Determination**

Natural Disaster Relief and Recovery Arrangement (NDRRA 2007) is a federal government scheme administered by the Attorney-General's Department to assist in the funding of the relief and recovery of communities following a natural disaster. It is based on the terms and conditions in the NDRRA Determination 2007 and has since been up-dated by NDRRA Determination 2011. It covers such events as bushfire, earthquakes storms, floods, cyclones, storm surge, landslide, tsunami, meteorite strike, tornado; but does not apply to drought, frost, heat-wave, epidemic and some other disaster events. (NDRRA 2007)

The NDRRA is a Federal Government program which is now administered in Queensland by the Queensland Reconstruction Authority to provide finance to local councils for restoration of infrastructure and public assets following natural disasters. This finance is provided to restore local communities to a pre-disaster condition and does not cover such works as realignment of roads, raising of bridges, or additional signage as these works are considered improvements and as such come under Resilient Works or Complementary Works funding. A State or Territory may claim NDRRA funding if a natural disaster occurs, the event exceeds \$240,000 and the State or Territory notifies the Attorney-General's Department of the event. (NDRRA 2007)

The NDRRA Determination 2011 regulates distribution of NDRRA funding to eligible organizations, such as councils, and individuals. It further defines a "natural disaster" in the context of the events that have occurred in Queensland 2010/2011. It provides further guidance regarding eligible organizations, works and projects for which NDRRA can be accessed for emergent and restorative work. (NDRRA Determination 2011)

## **3.4 Queensland State Government**

### **3.4.1 Disaster Management Act 2003**

The Disaster Management Act, 2003 is the state legislation that governs Local Government responsibilities in a disaster and gives authority for local government to act during a disaster. Section 57 directs local government to prepare a plan for disaster management in the local government area. Section 59 directs local government to review and renew the local disaster management plan and review its effectiveness at least once a year. Section 76 provides direction regarding general powers of local government during a disaster. These powers include ensuring public safety and order, prevention of loss of life, prevention of loss or damage to property and directions to respond to the disaster. Section 77 refers to General powers of local government during a disaster and includes authority to act to control movement of persons, animals or vehicles; give direction to regulate movement in the disaster area; evacuate from disaster area; enter the disaster area; take equipment into disaster area; close off a facility; do what is necessary regarding utilities; build earthworks or barriers; close a road to traffic; maintain, restore, or prevent destruction of essential services. Section 80 (1), (2) of the Act refers to function of local government to respond to a disaster and maintain equipment, personnel and plan for disasters so a quick response is rendered. Refer to Appendix D for relevant Sections of the Disaster Management Act, 2003. (Disaster Management Act, 2003)

### **3.4.2 Local Government Act 2009**

Local Government Act 2009 provides the legislative framework for local government to operate during normal time. Section 8 states that local government is an elected body responsible for local government. Section 9 gives the power to provide good local government. Section 13 outlines responsibilities of all employees of local government to effectively and efficiently implement policies and procedures to effect good government. Part 3 Section 59 to 75 of the Act deals with roads and other infrastructure. Specifically Section 60 gives authority to local government to control all roads within the local government area and Section 69 states that local government may deal with roads as necessary, for example, close roads. Refer Appendix E for relevant Sections of this Act. (Local Government Act 2009)



### **3.4.3 Queensland Reconstruction Authority Act 2011**

Queensland Reconstruction Authority Act 2011 was assented to on 21 February 2011 to provide the framework and means of operation for the Queensland Reconstruction Authority to manage the extreme disaster situation in Queensland that occurred 2010/2011 wet season. Sections 2 and 6 of the Act define the main purpose of the Act and define the disaster event and therefore establish eligibility for organizations such as TRC to obtain assistance for road works. Section 10 outlines QRA's functions and these include collecting information and data and establishing priorities for community infrastructure and community services needed for protection, rebuilding and recovery. (Queensland Reconstruction Authority Act 2011)

QRA is run by the Chief Executive Officer who is employed under this Act and other staff are employed under the Public Service Act. The Board consists of 7 members - the chairperson, 2 members nominated by Commonwealth, 1 nominated by Local Government Association of Queensland Ltd, and 3 other members. These members must have expertise in engineering, finance, planning or other fields deemed necessary. They meet at least once a month and they set the strategic priorities of the authority and make recommendations to the Minister regarding any reconstruction projects. TRC applications for funding for emergent and restoration works would be one of these projects. (Queensland Reconstruction Authority Act 2011)

Several other QRA documents were accessed to provide information regarding reconstruction. The documents outlined timelines, phases of recovery, methods of implementation and terms of agreement for funding. (QRA 2011) Refer Appendix F for relevant extract of Queensland Reconstruction Authority Act 2011.

### **3.4.4 Queensland Disaster Relief and Recovery Arrangement Guidelines**

Disaster Relief and Recovery Arrangements Guidelines 2009 – 2010 V 1 document outlines the government funding available at the time of the disaster events during the wet season of 2010 and 2011. This document provides all the information required for funding applications by local government to obtain funds for relief and recovery during and after a disaster. This funding is now administered in Queensland by QRA. Application forms in the back of this document have been slightly changed due to the establishment of QRA, however format and information required is still the same. (NDRRA Guidelines 2009-2010)

### **3.4.5 Design Guidelines Transport Network Reconstruction Program**

Design Guidelines Transport Network Reconstruction Program (TNRP) Statewide Program Office National Disaster Relief and Recovery Arrangements, Revision No.C, 17.5.11, Transport and Main Roads, Queensland Government, viewed August 2011 is the document produced by the Department of Transport and Main Roads Queensland to provide the design framework for the transport network reconstruction program. This document provides the guidelines for technical personnel to follow when performing any design, construction and maintenance tasks on the road network system. This document provides criteria for assessment of damage to roads. These guidelines use the current Queensland Design Standards such as the Road Planning and Design Manual (RPDM) and the Pavement Design Manual (PDM). Other cases where a relevant Queensland standard cannot be found, Austroads documents are applicable. ( TNRP 2011)

## **3.5 Local Government**

### **3.5.1 Annual Report**

The TRC Annual Report 2009-2010 is an annual report generated by the TRC disclosing the current year's operations, actions and achievements according to its stated organizational plan and vision. This Annual Report was presented at the Ordinary Meeting and adopted by Council on the 16 November 2010. This report supplied information regarding TRC region, council organization and governance, management plans specifically relating to disaster management, and the region's economy. (Annual Report 09/10)

### **3.5.2 Local Disaster Management Plan**

Local Disaster Management Plan 29 October 2009 (LDMP) was the version applicable during the events of 2010 and 2011. There is a new version that is being drafted and it may be submitted September 2011. The preliminary report for the Queensland Flood Commission of Inquiry Interim report was released with recommendations which were to be incorporated into any new disaster management plan. Thus, the new version of the disaster management plan which was to be released August 2011 was delayed. Due to time constraints this new plan will not be able to be included in this report. ( Fry, N 2011, pers. comm., 10 August).

This plan is authored by TRC Local Disaster Management Group (LDMG) and it outlines the authority and jurisdiction of the council to act in a disaster situation. Direction to author a plan comes from the Disaster Management Act 2003, Section 57 (1) and it covers management, prevention, preparedness, response and recovery. It provides graphs, maps and tables of relevant information for the Toowoomba area. (LDMP 2009)

### **3.5.3 Disaster Coordination Centre Standing Operating Procedures**

Disaster Coordination Centre Standing Operating Procedures (SOP 2011) is the document authored by TRC LDMG which outlines the operating procedures of the DCC. Activation and operating processes for effective operation are specifically documented. It describes the plan, function, roles and duties of personnel of the DCC, and whether data gathering is manual or electronic. (SOP 2011)

### **3.5.4 Statement of Kenneth Maxwell Gouldthorp**

This document by the Chief Executive Officer of the TRC, Mr Kenneth Gouldthorp, is the statement that he supplied in response to questions asked by the Queensland Flood Commission of Inquiry. It provided information regarding the initial management response and future planning of TRC regarding disaster management. (Gouldthorp, K.M 2011)

## **3.6 Additional Resources**

Terry McIvor, a senior civil engineer for TRC presented a conference paper ‘Toowoomba Tsunami??..... What The???’ at the Institute of Public Works Engineering Australia South West Queensland Branch Conference at Kingaroy on 20 May 2011. This paper presented a pictorial account of the disaster that occurred in the Toowoomba CBD and estimated costs, and it discussed some of the works that had been completed as at that date, and briefly mentioned some future flood mitigation plans. (McIvor 2011)

Various other resources such as Thom 2008 were accessed regarding the road damage assessment section for the provision of basic engineering of road construction.

### **3.7 Personal Comments**

Information has been sourced from TRC personnel where no written documentation could be accessed, for example, tacit knowledge gained from many years of experience within Council. Also interviews with critical personnel, Mr Norman Fry, Mr Andrew Volpatto and Mr John Byrnes from TRC were conducted to gain real time information regarding the emergent response.

### **3.8 Commission of Inquiry**

An independent Commission of Inquiry was set up on 17 January 2011 to investigate the flood disaster that occurred in Queensland and affected 78 percent of Queensland. The Queensland Floods Commission of Inquiry Interim Report was released August 2011 and the flood damage in the Grantham area and the TRC region was so severe that an entire chapter is dedicated to these areas. The document was used to assist with the analysis of TRC and Lockyer Valley Regional Council response to the disaster. In addition to the Interim Report official interviews by the Commission were accessed. (QFCI 2011)

### **3.9 Lockyer Valley Regional Council**

#### **3.9.1 Lockyer Valley Community Recovery Plan**

Lockyer Valley Community Recovery Plan, written on 3 February 2011 was the councils response to the unfolding emergency. This plan provided a broad view of the situation and documented the council's awareness of their responsibilities to the community to achieve recovery. (LVCRP 2011)

#### **3.9.2 Lockyer Valley Regional Council Annual Report**

Lockyer Valley Regional Council Annual Report 2009-2010 provided a background of the Lockyer Valley region and the LVRC organizational structure.

#### **3.9.3 Additional Resources**

Additional resources were accessed to gain an overview and insight into the LVRC and their management of the disaster on 10 January 2011 including perusing newspaper articles, LVRC Newsletters, LVRC Website and personal interviews with the mayor.

### **3.10 Human Resource**

Human Resource and organisational behaviour resources were accessed to provide scholarly guidance regarding some of the issues that were identified in the analysis and evaluation section.

### **3.11 Conclusion**

Many government legislations, guidelines, policies and procedures were reviewed to establish authority for local government to operate within their local community to repair and restore a safe community. Federal, State and Local government have all authored documents to provide clear guidelines and directions for disaster management by local government bodies and their staff. Legislation which provides for funding and standards regarding the technical aspects of repair of road network systems following a disaster event have been authored by federal and state governments. The Queensland Flood Commission of Inquiry produced their findings regarding the wet season of 2010/2011 and stated recommendations for local councils to implement to improve disaster management for their areas. Various other resources were accessed such as technical literature for repair of roads and human resource literature to assist with the analysis and evaluation of the management systems. TRC and LVRC documents regarding the flood event and personal interviews of TRC and LVRC key personnel were reviewed.

# **Chapter 4 – Toowoomba Regional Council Disaster Management**

## **Role, Response, Analysis and Evaluation**

### **4.1 Introduction**

This chapter will describe the rain event of 10 January 2011 which resulted in the flash flooding that occurred in the Toowoomba and Lockyer Valley areas. It will then discuss the role and responsibilities of Toowoomba Regional Council in a disaster situation to repair and restore the road network system. The legislative instruments, guidelines, policies and procedures that control the TRC will be described. The emergent and short term restoration response of the TRC to this flooding event and the disaster management system in place to repair the road network system will be analysed. Some examples of typical road damage and the emergent and restorative works carried out will be described and illustrated. An analysis and evaluation of the TRC response and systems will be performed with a view to identifying any issues that may be present in the current management system.

### **4.2 The Event**

On Tuesday, January 11, 2011 the Premier of Queensland, Anna Bligh, declared three-quarters of Queensland a disaster zone. This declaration was in response to the enormous flood event that had hit southern Queensland. This declaration gave police and emergency personnel authority to take any necessary action to preserve life and property. (Bligh 2011)

The Gowrie Creek catchment area covers an area of approximately 56 square kilometres on the Darling Downs in southeast Queensland. This area has 14 towns and includes the city of Toowoomba and has a population of 162,057 people. The Gowrie Creek catchment area has its source in East and West Creeks at the southern end of Toowoomba city and merges to form Gowrie Creek near Russell Street at the railway station in the Toowoomba CBD. Gowrie Creek eventually flows into the Condamine River and into the Murray-Darling system. (McIver 2011)

High levels of rain had fallen over southeast and southwest Queensland during December 2010 and had saturated the catchment area. The following rainfalls were recorded in Toowoomba area over the month of December 2010:

- North Toowoomba 544 mm
- East Toowoomba 517mm
- Pittsworth 434mm
- Yarraman 332mm
- Crows Nest 307mm
- Millmerran 325mm
- Oakey 304mm

During early January 2011 high rainfalls continued in Toowoomba city area:

- Toowoomba airport 46.8mm on 3.1.11 and 67.8mm on 6.1.11, and
- Middle Ridge 54.6mm on 6.1.11

(ICA 2011)

Toowoomba's water supply dams of Cooby, Perseverance and Cressbrook Dams went from extremely low levels to being 53.2% full in December 2010 and rose to 75.2% by 9 January 2011 and by 10 January the dam levels were 127.2% full. (QFCI 2011)

On 10 January 2011 two storm cells passed over south-east Queensland as one intense thunderstorm. Intense rainfall began between 1pm and 2.30pm on Monday 10 January 2011 with rain falling on the western and the eastern watersheds of the Great Dividing Range. Rain on the western side of the range ran off into East, West, and Gowrie Creeks. Rain on the eastern side of the range ran off into tributaries of the Lockyer Creek. The rainfall that fell into the Toowoomba City catchment area caused massive and severe flash flooding in Toowoomba City between 1.30pm and 2.45pm on Monday, 10 January 2011. (QFCI 2011)

This storm event was widespread and affected the Lockyer Creek catchment area in the Lockyer Valley. This catchment, an area of 2,600 square kilometres, had also been experiencing similar weather conditions resulting in a saturated catchment and flooding creek systems. When the storm cell dropped rain over the Toowoomba area the water that fell to the west of the watershed flowed down into the Gowrie Creek system but the water that fell to the east of the watershed flowed down the ranges into the Lockyer Creek system. The steep gradients of the catchment areas contributed to the flooding

event. This resulted in the massive flood event that occurred in the Lockyer Valley on 10 January 2011. (QFCI 2011)

In Toowoomba city the surging water washed away bridges, damaged road and railway lines and flooded the central part of the CBD. The narrow watercourses caused the water to flow at a high velocity, with great depth and carrying away all in its path. The bridges along West and East Creeks were overtopped and served as a barrier holding back the water, and causing more flooding upstream. The increase of flooding levels caused other objects such as cars, housing material, various objects and debris to be washed into the flow. The flood mitigation basins reached their capacity and overtopped. (McIver 2011)

### **4.3 The Role and Responsibilities of Toowoomba Regional Council**

The disaster declaration by the Premier on 11 Tuesday 2011 gave the local government body, in this case TRC and in the Lockyer Valley, Lockyer Valley Regional Council (LVRC), responsibility to act under the Disaster Management Act. This report will now discuss the legislative instruments under which TRC performs its role and the policies and procedures within their system that define their role and responsibility to repair and restore the road network system. All government activity is controlled by a legislative authority and local governments have to act within the constraints of these laws. Therefore, a reasonably detailed, although not exhaustive, treatment of the resource information will be performed as it is necessary to understand the complexities of how local governments perform their responsibilities to manage disaster situations.

Local governing bodies have a legislated responsibility to provide their area with effective governance which results in a safe and efficiently run community. Local councils have a legislated responsibility to manage and prepare for the possibility of a disaster event which is defined as an event that will have a profound and adverse affect on the safety of life and property within their area. This responsibility includes investigating and planning for disaster mitigation, prevention, preparedness, response and recovery from an event. The local governing body in to ensure a 'response capability' to an event which means that their planning is to include preparedness to provide personnel and resources sufficient to deal with the emergency, a disaster plan and disaster management group to manage an event and the council must provide and maintain a facility and equipment to be used as a coordination centre in the event of a



disaster. The Disaster Management Act 2003 is the main legislative instrument which provides the authority and directions under which Councils are to act in a disaster event. (Disaster Management Act 2003), (LDMP 2009)

#### **4.4 Legislative Authority for Local Governments to Act**

The following Acts and guidelines outline the legislated instruments under which local governments are empowered to conduct their responsibilities.

##### **4.4.1 Federal – Australian Government Legislation**

###### **4.4.1.1 Natural Disaster Relief and Recovery Arrangement**

Natural Disaster Relief and Recovery Arrangement (NDRRA 2007) is a federal government scheme administered by the Attorney-General's Department to assist in the funding of the relief and recovery of communities following a natural disaster. It is based on the terms and conditions in the NDRRA Determination 2007 and has since been up-dated to NDRRA Determination 2011. It covers such events as bushfire, earthquakes storms, floods, cyclones, storm surge, landslide, tsunami, meteorite strike, and tornado; but does not apply to drought, frost, heat-wave, epidemic and some other disaster events. (NDRRA 2007)

The NDRRA is a Federal Government program which is now administered in Queensland by the Queensland Reconstruction Authority to provide finance to local councils for restoration of infrastructure and public assets following natural disasters. This finance is provided to restore local communities to a pre-disaster condition and does not cover such things as realignment of roads, raising of bridges, or additional signage as these works are considered improvements and as such come under Resilient Works or Complementary Works funding. A State or Territory may claim NDRRA funding if a natural disaster occurs, the event exceeds \$240,000 and the State or Territory notifies the Attorney-General's Department of the event. (NDRRA 2007)

The NDRRA Determination 2011 further defines distribution of and eligibility for NDRRA funding to eligible organizations, such as councils, other agencies and individuals in the context of the Queensland disaster event of 2010/2011. It further defines a "natural disaster", and provides specific guidance for eligibility for local government, such as TRC, to apply for this funding for emergent and restorative works to the road network system. (NDRRA Determination 2011)

## **4.4.2 State Government Legislation**

### **4.4.2.1 Disaster Management Act 2003**

The Disaster Management Act, 2003, is the state legislation that governs Local Government responsibilities in a disaster and gives authority for local government to act during a disaster and perform such duties as making a plan, forming a disaster group, and even closing roads or putting up barriers. The sections listed below are the sections that specifically refer to the authority and responsibility to ensure the road network system is safe for public use.

- Section 29 directs local government to establish a local disaster management group and Section 30 outlines the functions of this group.
- Sections 57 direct local government to prepare a plan for disaster management in the local government area.
- Section 59 directs local government to review and renew the local disaster management plan and review its effectiveness at least once a year.
- Section 76 provides direction regarding general powers of local government during a disaster. These powers include ensuring public safety and order, prevention of loss of life, prevention of loss or damage to property and directions to respond to the disaster.
- Section 77 refers to General powers of local government during a disaster and includes authority to act to control movement of persons, animals or vehicles; give direction to regulate movement in the disaster area; evacuate from disaster area; enter the disaster area; take equipment into disaster area; close off a facility; do what is necessary regarding utilities; build earthworks or barriers; close a road to traffic; maintain, restore, or prevent destruction of essential services.
- Section 80 (1), (2) of the Act refers to the function of local government to respond to a disaster and maintain equipment, personnel and plan for disasters so a quick response is rendered. A local government must ensure that it has a disaster response capability which means that the local government must have the ability to provide sufficient resources – equipment and personnel – to efficiently respond to a disaster situation and restore the community back to a safe environment as soon as possible.

(Disaster Management Act 2003) (LDMP 2009)

Refer to Appendix D for relevant Sections of the Disaster Management Act, 2003.

#### **4.4.2.2 Local Government Act 2009**

The Local Government Act 2009 provides the legislative framework for local government to operate and to perform such duties as closing roads.

- Section 8 states that local government is an elected body responsible for local government.
- Section 9 gives the power to provide good local government.
- Section 13 outlines responsibilities of all employees of local government to effectively and efficiently implement policies and procedures to effect good government.
- Part 3 Section 59 to 75 of the Act deals with roads and other infrastructure, and, specifically Section 60 gives authority to local government to control all roads within the local government area, and
- Section 69 states that local government may deal with roads as necessary, for example, close roads.

(Local Government Act 2009)

#### **4.4.2.3 Queensland Reconstruction Authority Act 2011**

The Queensland Reconstruction Authority Act 2011 was assented to on 21 February 2011 to provide the framework and means of operation for the Queensland Reconstruction Authority (QRA) to manage the extreme disaster situation in Queensland that occurred 2010/2011 wet season. (Queensland Reconstruction Authority Act 2011)

Sections 2 and 6 of the Act define the main purpose of the Act and the disaster event and therefore establish eligibility for organizations such as TRC to obtain assistance for road works. Section 10 outlines QRA's functions and these include collecting information and data, for example, applications for funding assistance from local councils for emergent and reconstruction works following a disaster. QRA also establishes priorities for distribution of funding for community infrastructure and community services needed for protection, rebuilding and recovery. (Queensland Reconstruction Authority Act 2011)

QRA is controlled by the Chief Executive Officer and a Board of seven members who must have expertise in engineering, finance, planning or other fields deemed necessary. QRA issues documents at various times outlining timelines, phases of recovery,

methods of implementation and terms of agreement for funding for emergent and reconstruction works. (QRA 2011) For example, in August 2011 QRA published QRA Submission Guide Version 3 as an update for organisations to use to assist in the application for funding processes. (QRA Submission Guide 2011)

#### **4.4.2.4 Queensland Disaster Relief and Recovery Arrangement Guidelines**

The Disaster Relief and Recovery Arrangements Guidelines 2009 – 2010 V 1 (NDRRA Guidelines 2009) document outlines the government funding available at the time of the disaster events during the wet season of 2010 and 2011. This document provides all the information required for funding applications for local government to obtain funds for relief and recovery during and after a disaster.

This document identifies that the funding for restoration of roads and network systems will come from NDRRA funding program which is now administered by QRA. Application forms in the back of this document have been slightly changed due to the establishment of QRA, however format and information required is still the same. (NDRRA Guidelines 2009)

#### **4.4.2.5 Design Guidelines Transport Network Reconstruction Program**

Design Guidelines Transport Network Reconstruction Program (TNRP 2011) is the document produced by the Department of Transport and Main Roads Queensland to provide the design framework for the transport network reconstruction program. This document provides the guidelines and criteria for damage assessment for technical personnel to consult when performing any design, construction and maintenance tasks on the road network system. These guidelines use the current Queensland Design Standards such as the Road Planning and Design Manual (RPDM) and the Pavement Design Manual (PDM). Other cases where a relevant Queensland standard cannot be found, Austroads documents are applicable. ( TNRP 2011)

### **4.5 Local Government Instruments**

To fulfil the responsibilities outlined in the above legislation and guidelines local governments have to prepare a local disaster management plan, form a local disaster management group, establish a disaster coordination centre and set up the necessary management and organisational structures and systems to coordinate, manage, respond to and recover from a disaster event. These arrangements are supported by several other

support plans, such as the Evacuation and Welfare Management Plan, and agencies, such as SES, that the local body is responsible for coordinating in the event of a disaster. (LDMP 2009)

#### **4.5.1 Local Disaster Management Plan**

The Local Disaster Management Plan (LDMP) 29 October 2009 was the version applicable during the events of 2010 and 2011. This plan was authored by TRC Local Disaster Management Group (LDMG) and it outlines the authority and jurisdiction of the council to act in a disaster situation. The plan provides for the coordination and management of resources and personnel before, during and after a disaster event. Direction to author a Plan comes from the Disaster Management Act 2003, Section 57 (1). The plan covers management, prevention, preparedness, response and recovery, and details graphs, maps and tables of relevant information for the Toowoomba area. The Plan directs the local government body to establish a LDMG. (LDMP 2009)

#### **4.5.2 Local Disaster Management Group**

The Local Disaster Management Group (LDMG) is the body that coordinates activities once a disaster event situation has been activated. This body will ensure that TRC fulfils its legislated responsibilities of preparedness by preparing a disaster management plan and considering such situations as disaster risk management, prevention, preparedness, response capability and recovery capability. It will review and test the disaster management system and is responsible for arranging and coordinating an all-agencies participation. That is, it will ensure that all essential services, such as Police, Ambulance and Fire Service, electricity and communications services, health and other community services, are involved and cooperating in the plan. These agencies will fill either a lead or supporting role depending on the nature of the emergency. For example, TRC is the lead agency in such events as flood, earthquake or landslide, Queensland Police Service is the lead agency for major transport accident - air and road, and search and rescue, State Emergency Services is the lead agency for storm damage. (LDMP 2009)

The TRC must organise and establish a Disaster Coordination Centre to be used for coordinating and managing any disaster event which may occur. There are a number of support plans which are also in place but are beyond the scope of this document. (LDMP 2009)

### **4.5.3 Local Disaster Co-ordination Centre**

The TRC Local Disaster Coordination Centre (DCC) consists of the Operations Centre and the Call Centre. When an event is activated the DCC is located in the TRC Human Resource Training Room, 2<sup>nd</sup> Floor, 543 Ruthven Street, TRC building next to City Hall. Note: This facility has now been relocated to a purpose-designed Customer Service Centre in Little Street, Toowoomba. The main role of the DCC is to:

- *‘Manage information collection, analysis and dissemination;*
- *Develop intelligence and strategic planning capability;*
- *Manage the acquisition and deployment of resources as requested;*
- *Develop and maintain an overall record of the event.’*

(SOP p10 2011)

The DCC operates under procedures outlined in the TRC Disaster Coordination Centre Standing Operating Procedures (SOP) which are prepared by the LDMG. The DCC will begin to operate when a disaster event is activated. It operates in three groups – a decision group (the lead agency and other support personnel), liaison officers group (representatives of other agencies, e.g. police or ambulance), and staff. The staff group comprises TRC staff personnel trained for such an event, and the call centre personnel trained in the software program Pathway. The Call Centre is the first point of contact for incoming calls to the DCC during the event. The LDMP, the LDMG and the DCC recognises four activation phases – Alert (white), Standby (yellow), Activation (red), and Stand down (green); then final phase Debrief (blue). (SOP 2011)

### **4.5.4 Local Disaster Co-ordination Centre Standing Operating Procedures**

The Disaster Coordination Centre Standing Operating Procedures (SOP) is the document authored by TRC LDMG which comprehensively outlines the operating procedures of the DCC. Activation and operating procedures for effective operation are specifically documented. It describes the plan, function, roles and duties of personnel of the DCC, and whether data gathering is manual or electronic. (SOP 2011)

The SOPs are the management system in place for TRC to operate in a disaster situation. A basic flow of events is described below to provide the steps that would be followed when a disaster event is declared. (SOP 2011)

#### **4.5.4.1 Basic Operating Procedures**

- Activation of LDMP.
- DCC becomes operational.
- Call Centre becomes the first point of contact for all incoming calls, for example, calls regarding damage to roadways during the disaster event.
- The information is collected, collated, confirmed, interpreted, acted upon, recorded, stored and filed.
- The TRC 'Pathway' system is used if electronic means are available and a manual system is available in the event of power failure. Pathway is a computer software system that provides the capability of recording, updating, monitoring, tracking, information collation and reporting any information that comes into the DCC Call Centre.
- An Operations Log is created to log all incoming and outgoing facsimiles and emails are recorded on Pathway.
- Manual forms are used to record and action incoming and outgoing requests in the event of power failure.

(SOP 2011)

#### **Reports:**

- The DCC issues Situation Reports (SITREPS) which provide a coordinated description of the event as it unfolds.
- These reports are circulated to relevant stakeholders such as the District Disaster Coordinators.
- All media reports are prepared by the Media Liaison Officer.

(SOP 2011)

#### **4.5.4.2 Power Failure**

The SOP provides for a manual system of information gathering and distribution of jobs during the initial setup processes or during power failure. This system involves handwritten logs and assistance request forms. This system consists of colour coded and carbon copy message forms and Manual Request for Assistance Forms. This system allows for the tracking of a job from when it comes into the DCC to completion of the request as it is returned to the DCC by the relevant agency or department when the action is finalised to be filed. (SOP 2011)

Refer Appendix G for TRC DCC Message Form Manual and TRC DCC Request for Assistance Form Manual (SOP 2011)

Note: Manual forms are illustrated as these are alluded to in the Queensland Flood Commission of Inquiry Interim Report statement by Mr K. Gouldthorp.

#### **4.5.4.3 Rostering**

The SOP provides for 24 hour rostering of staff in eight hour shifts for the duration of the event. (SOP 2011)

#### **4.5.4.4 Response Capability and Requests**

Requests for assistance and the use of resources will be allocated depending on the priority criteria and availability of resources and personnel. Emergency Services are controlled by the relevant agency. Detailed record keeping and tracking is employed at all stages of the process. (SOP 2011)

#### **4.5.4.5 DCC Equipment**

The facility, equipment, maintenance and readiness of the centre is the responsibility of the local government. (SOP 2011)

#### **4.5.4.6 Other Factors**

There are other factors which the SOP deal with such as briefings, costing, and security which are relevant to the overall management of a disaster situation but are beyond the scope of this project. (SOP 2011)

### **4.6 TRC Management Response to the Disaster**

#### **Emergent and short-term works to repair road network system**

The TRC response to the declaration of the disaster event will now be discussed. The management system, its activation and the processes that were followed with a view to repair and reconstruction of the road network system - emergent works and short term restoration works will be analysed.

The limitation of this section includes that the restoration phase is still ongoing and developing; and guidelines, management procedures and systems are being up-dated as



the need becomes apparent. TRC has until June 2013 to complete the restoration works. (Byrnes J 2011, e-mail, 12 October)

The management system in place included the LDMP, LDMG and the DCC with all personnel using the SOP's. The immediate role on Monday 10 January was to preserve life and property. The management system in place included a chain of command and reporting for key personnel. Two staff members, Kevin Wruck and Norman Fry, are the TRC staff members whose primary role is disaster management and coordination. The LDMP and SOP for the DCC were authored by these members. Mr Fry is the Disaster Coordinator for the TRC as well as functioning as the local State Emergency Services (SES) Controller. (Fry, N 2011, pers.com., 6 October)

#### **4.6.1 Emergency Response – immediate response**

Because of the high rainfall that had been experienced within the region from 24 December 2010 the LDCC and the LDMG were on ALERT and in regular contact with key personnel. On the day of Monday 10 January 2011 the LDMG were actually meeting in the Council offices and the LDCC status had been upgraded to STANDBY. When the news of flash flooding occurring in the CBD became known the DCC was activated at approximately 3.30pm on 10 January 2011 and then maintained a 24 hour operating timeframe for the duration of the disaster. Initially, because of the nature of calls being received the LDMG, the Queensland Police Service and the Queensland Fire and Rescue Service took charge of the events. Members of the Swift Water Rescue Team were in Toowoomba and participated in the response. (QFCI 2011)

Mr Ken Gouldthorp, CEO of TRC, in his statement to the QFCI, stated that the immediate response from council was to activate the LDCC and the SOP's. The council then closed unsafe roads to public access with the assistance of Police and erected appropriate warning signage where needed. The council also issued safety warnings regarding unsafe roads via local radio and other media and asked residents to refrain from travel if possible. The council website publicised road and safety conditions and other information to keep the public informed of the situation. From 4.00pm 10 January 2011 to 7.00pm 17 January 2011 the DCC Call Centre received 6,271 calls. Key personnel met twice a day for the duration of the disaster to monitor and control the situation with a view to restoring the community back to normal as quickly as possible. (Gouldthorp 2011)

Emergent work performed immediately after the disaster focused on preserving public health and safety and restoring the road system to reopen road network systems for citizens to resume normal communications. Therefore, immediate repair work entailed inspections, removal of debris, performing road closures by erecting appropriate signage and barriers, traffic control, pavement repair, road patching, mill and fill, and backfill. Where the damage was not easily repaired to restore the road to a safe and trafficable condition, road barriers and road closures were performed to wait for further assessments and reconstruction works. (Toowoomba District Template V16, TRC, 2011)

Damage was assessed into major, medium and minor. Major equated with requiring a design team and/or consultant team, needing both emergent and restoration works, or damage requiring a road closure. Medium was damage requiring heavy plant such as graders, rollers and trucks to complete the works. Minor was damage that could be repaired by small gangs easily and quickly. Damage was also prioritised according to a scale of 1 – 5. 1 was the highest priority, for example, restoring access for residents. 5 was the lowest priority, an example of which would be eroded side drains which does not affect the flow of traffic. (Toowoomba District Template V16, TRC, 2011)

Emergent works were to be completed within 60 days of the activation date of 30 December 2010 as per the NDRRA Guidelines. An extension of this time was sought from Emergency Management Queensland and was granted. TRC completed the emergent works within this extended timeframe by 15 April 2011. Applications for NDRRA funding was completed and submitted by 30 June 2011 within the specified time frame. (Byrnes J 2011, e-mail, 12 October)

#### **4.6.2 Recovery and Restoration**

Once the initial disaster phase was over Toowoomba entered the recovery and restorative phase when reconstruction of the community could begin. The city of Toowoomba was actually isolated by rail and road until 13 January 2011 when the road was re-opened to heavy transport on the New England Highway to Warwick. Internet and telecommunications problems existed with the agency of Telstra fully cooperating to restore telecommunication infrastructure back to normal. Some jobs such as testing of Toowoomba's water supply, fixing of two major water mains, and monitoring of

sewage and waste facilities obviously achieved a high priority rating. The DCC issued Situation Reports (SITREPS) once a day which were circulated to all relevant stakeholders, departments and agencies. During this phase leading personnel monitored and assessed the situation, including assessment of damage to roads and infrastructure so recovery could be strategically planned. The council during this stage continued to provide water, sewage and road access and provided assistance by removing debris, and cleaning up roads. (Gouldthorp 2011)

#### **4.6.2.1 Restoration Works**

The construction and maintenance section use spreadsheets to collect and collate road data. This system is being used to collect and collate flood damage data during the recovery phase. A database system, Asset Maintenance Management system, is being developed for this information to be collated in to which will record all road conditions. A section will include ‘specific damage’, so that in future all types of damage, including flood damage, will be able to be easily filtered. (Byrnes J 2011, email 11 October)

Restoration works and submissions are to be completed within 2 years of the activation date of 30 December 2010 and the process of reconstruction and restoration is still in progress. Note: The agreed timeframe for completion is now June 2013 (Byrnes J, 2011, e-mail, 12 October).

See Chapter 6 Funding Strategies for a full explanation of the funding application process.

### **4.6.3 Typical Road Damage in Toowoomba**

#### **Emergent and Reconstruction Works**

The following section will visually illustrate a few examples of the extensive damage that was sustained to the road system and the reconstruction works that have already been completed. The TRC has worked towards attaining self-imposed deadlines to achieve emergent and restorative works. The timeframes for emergent works was achieved and the restorative phase is still in progress. The following images are typical examples of the road damage sustained in the flooding event and the complex restoration works that have been effected by the TRC.

**Flood debris removal, bridge scouring, pavement damage:**

The illustration below shows the damage sustained to the Griffith Street Bridge and road. Damage was so severe immediate emergent work was to close the area off to traffic.



**Figure 7 Griffith Street Bridge – Debris**

(Sourced: TRC NDRRA Photo file 2011)

Reconstruction works included removal of debris, replacement of road furniture, resurfacing and repair of bridge structure and unsealed shoulders.



**Figure 8 Griffith Street Bridge after Reconstruction**

(Sourced: TRC NDRRA Photo file 2011)

**Scouring of bridge structures:**

This illustration shows flood damage sustained to the South Street area. Damage was so severe emergent works were to cordon off the area and close South Street to all traffic.



**Figure 9 Wilf Gowlett Drop Structure South Street**

(Sourced: TRC NDRRA Photo file 2011)

Restoration works included repair of bridge structure and scour protection, road furniture, e.g. guard rails, and re-profiling sealed surface.



**Figure 10 Wilf Gowlett Drop Structure after Reconstruction**

(Sourced: TRC NDRRA Photo file 2011)

### **Scouring /loss of culvert inlet/structure and protection works:**

This figure illustrates the damage to the Bridge Street Culvert system. Again, damage was so severe emergent works were to close the affected area to all traffic.



**Figure 11 Bridge Street Culverts**

. (Sourced: TRC NDRRA Photo file 2011)

Reconstruction of Bridge Street culverts included replacing culvert structure, construct scour protection, repair road furniture and re-surfacing of pavement.



**Figure 12 Bridge Street Culverts after Reconstruction**

(Sourced: TRC NDRRA Photo file 2011)

## **4.7 Analysis and Evaluation of Management System**

The TRC disaster management system adheres to legislative requirements. TRC organised and authored the appropriate disaster management system comprising a Local Disaster Management Plan, a Local Disaster Management Group, a Disaster

Coordination Centre with Standing Operating Procedures. The TRC had organised appropriate management systems for disaster coordination and management and this system coped with the events of 2010/2011. However, it is noted that the events were of such proportion as to require assistance from all levels of government, other agencies and communities to effect recovery and a state-wide inquiry was conducted by the Queensland government into the disaster. During the event and recovery phases certain issues have been identified within the system where improvements could be achieved. These issues relevant to damage to the road network system during the disaster events will now be discussed.

#### **4.7.1 Issues and Recommendations**

Mr Fry, the Disaster Coordinator for the TRC, identified some issues that became apparent during the disaster event that needed to be reviewed and could be improved. These issues were further expanded on by Mr Ken Gouldthorp, CEO of TRC, in his statement provided to the QFCI 2011. The following recommendations and improvements summarise the issues, recommendations and improvements that could be made.

##### **4.7.1.1 Receiving Calls**

During the disaster procedures as outlined in the SOP for receiving calls were performed by the DCC. The calls for assistance came into the DCC by electronic means and an Operations Recorder printed these on hard copy and handed them to the relevant agency for action. The agency would then perform the necessary action and report this back to the Operations Recorder for recording and filing. The computer software program has the ability to communicate requests electronically but Council has decided to use a hard copy communication system to achieve a more secure system. (Gouldthorp 2011)

##### **4.7.1.2 Computer program**

Pathways is a Customer Service program designed to log customer information including names, addresses, service history, complaints, actions, results and closing of job. This program is designed to route the job to the correct person for action, log the result and provide a history when re-opened. It is planned to integrate computer software programs in the future to provide a comprehensive information system for collecting and collating of information. (Byrnes J 2011, e-mail 11 October)

The computer program of Pathways used by Council staff in the Customer Service Centre was not a new program to Council but rather a new program within the disaster management environment. Staff employed when the DCC is activated should all be trained in this program to facilitate full use of the software and therefore a more efficient and effective application of its capability in disaster management for collecting, collating and disseminating information. (Fry 2011, pers. Com., 6 October)

#### **4.7.1.3 DCC Facilities and Equipment**

Gouldthorp (2011) stated that ‘equipment and communication systems...was rudimentary but effective. The LDCC was adequate for the task...and had the computer and communication equipment available for use when required.’

Some issues were experienced concerning the facilities and equipment when it operated for the 2 week disaster period and equipment had to be taken from other areas into the DCC area – this took time and resources. These identified issues have resulted in the biggest change in the management system. The DCC location has now been moved from the HR Room, 2<sup>nd</sup> floor of Council offices to the Customer Service Centre in Little Street, Toowoomba. This dedicated centre can immediately convert to a DCC as soon as a disaster activation occurs. The centre now has a purpose built telecommunications system, trained staff that are familiar with the computer system, equipment and facilities. (Fry 2011, pers. Com., 6 October)

#### **4.7.1.4 Communication**

Problems with the internet connections were experienced which compromised the ability for use of email and internet services. Facsimile communication had to be used and hard copy manuals were accessed. The importance of backup communication and hardcopy resource material such as manuals is therefore necessary to alleviate this problem. (Gouldthorp 2011)

#### **4.7.1.5 Radio Communication**

Re-installing the use of radio communications in council vehicles to ensure reliable communication not reliant on power or the telecommunications systems such as mobile phone systems is important. CB Radio also allows all personnel to listen to radio communications as they are broadcast and provides a better understanding to personnel



in the field as to what is happening. The necessity for manual backup systems was highlighted by this disaster. (Gouldthorp 2011)

#### **4.7.1.6 Response Capability – Staffing**

The disaster situation had coincided with the summer holiday periods and consequently all staff were not available. TRC had kept a skeleton staff on call over the holiday period, but during the disaster a number of technical and working staff were called back from holiday to handle the situation. (Fry 2011, pers. Com., 6 October) Council always maintains a core workforce and this proved adequate to cope with the disaster even though some staff worked long hours to restore services and infrastructure. Essential services during the immediate response were also provided by the Police Service, Queensland Fire and Rescue and swift water rescue personnel. (Gouldthorp 2011)

The disaster management planning had prepared for two staff members to be capable of performing a given role within the DCC to ensure that the skills required could be sourced from within. This number is under review at present and will be extended to 3 persons to be capable of performing a given role in order to cover the 24 hour period that the DCC operates during a disaster situation. (Fry 2011, pers. Com., 6 October)

#### **4.7.1.7 Preparedness**

The TRC had a legislated responsibility to ensure preparedness for a disaster event. The TRC had established a LDCC and a LDMG and had endorsed LDCC SOP. Council had carried out practise exercises, established a website to publish information regarding disaster management plans, including evacuation centres, emergency contacts and other emergency procedures. TRC had also applied for Federal and State funding under the Natural Disaster Resilience Program for disaster preparedness and developed the software necessary to link geographic information to the Customer Service database and the Central Mapping System. (Gouldthorp 2011)

#### **4.7.1.8 Amalgamation Issues**

The amalgamations of the local councils was seen as creating some negative effects for the disaster management of the TRC. For example, the local SES presence had significantly reduced in the rural districts of the TRC post amalgamation and thus increased pressure on the TRC to supply resources to the rural areas. The functional restructure of local councils was not seen as an issue at the time of the disaster but

during analysis of the events it became obvious that local knowledge of an area is very important. It is recommended that local council service centres in the original district areas maintain a presence and ability for local disaster management within their area. (Fry 2011, pers. Com., 6 October) This point was confirmed by CEO, Mr Gouldthorp, in his statement for the QFCI 2011. Gouldthorp (2011) further stated that TRC services the entire region, not just Toowoomba city, and it was felt that this was an advantage in coordinating use of emergency services personnel to achieve maximum and appropriate usage of resources and personnel (Gouldthorp 2011).

#### **4.7.1.9 Aligning Regions**

It is recommended that for more efficient management of any disaster it is important that the areas covered by a particular service are aligned. For example, if the TRC region would align with the Queensland Police Service, Ambulance and Fire and Rescue Services regions this would make it easier to manage any disaster event within that region. (Gouldthorp 2011)

#### **4.7.1.10 Priority Projects**

The road system at James and Kitchener Street constitutes an important component of the national highway system yet it is now apparent that it is susceptible to severe flash flooding. This is a priority issue to be dealt with in the future. (Gouldthorp 2011)

Toowoomba Council has an ongoing program of flood mitigation for the East, West and Gowrie Creeks but this is subject to available funding. For the purposes of ensuring efficient road network systems this works program should be given priority. (Gouldthorp 2011)

#### **4.7.1.11 Sightseers**

Use of the road network system in times of disaster or emergency by curious people continue to be a problem that needs to be addressed. (Gouldthorp 2011)

### **4.7.2 Commission of Inquiry**

The Queensland Flood Commission of Inquiry was set up on 17 January 2011 to investigate the flood disaster that occurred in Queensland and affected 78 percent of Queensland. The Queensland Floods Commission of Inquiry Interim Report was released August 2011 and the flood damage in the Grantham area and the TRC region

was so severe that an entire chapter is dedicated to these areas. This document was used to assist with the analysis of TRC management response. (QFCI 2011)

The Commission report notes that initially the immediate response leadership was handed directly to the Queensland Police Service and the Queensland Fire and Rescue Service. The LDMG was then activated and the DCC became operational. The LDMG then coordinated emergency operations with the DCC Call Centre operating as a point of coordination of the emergency and dissemination of resources and personnel to render assistance in answer to calls for help. Road closures because of flooding and damage to road surfaces was difficult because of the extent of the disaster. The Commission of Inquiry found that the TRC had correctly and appropriately fulfilled its responsibilities for natural disaster preparation. (QFCI 2011)

#### **4.8 Conclusion**

The disaster event which occurred in Queensland 2010/2011 culminated in the flooding event of Monday 10 January 2011 where Toowoomba and the Lockyer Valley sustained huge flooding damage. The area was declared a disaster zone activating local council disaster management plans and procedures. Toowoomba Regional Council is the local government body responsible for disaster management in the Toowoomba area and they have a legislated responsibility to prepare, respond to and manage a disaster event. Legislation such as the Disaster Management Act and the Natural Disaster Relief and Recovery Arrangement are some of the instruments under which local government must prepare their disaster response capability, respond to a disaster and carry out recovery and restoration activities to restore their communities back to normal. Local governments must prepare a disaster management plan and establish a disaster management group and organise procedures and policies to govern the management of the event such as the Disaster Coordination Centre Standing Operating Procedures. These procedures provide systems to be followed during a disaster event to manage immediate response, emergent and restorative situations, and recovery phases. The emergent and restoration phase of this event was described with some illustrations of the damage sustained in the event and the reconstruction works achieved thus far. An analysis and evaluation of the policies and procedures was carried out and an interview was conducted with Mr Fry, the Disaster Coordinator and SES controller for the area, to obtain feedback regarding the actual events at the time of the disaster. His comments and recommendations are noted. A statement supplied by the CEO of TRC was also

used to review the management response of the council during this disaster. Recommendations for improvements to the management system included retaining hard copy recording of calls and actions, further development of comprehensive computer software for data collection and management and training for staff, developing a dedicated disaster coordination centre, re-installing CB radio communications in council vehicles, increasing staffing capability, maintaining local disaster districts and ensuring priority road-works are completed. The QFCI Interim Report was accessed and it was concluded that Toowoomba had fulfilled its legislated responsibility for disaster preparedness.

# **Chapter 5 – Roads**

## **5.1 Introduction**

A review of the damage caused by the flood that occurred on the 10 January 2011 will be presented. Toowoomba area and TRC will be described including the infrastructure and road network system that comes under the control of TRC. A basic description of a road will be provided. Typical damage will be described and illustrations of damage will be presented. Generic methods of repair for emergent and short term restoration works will be reviewed. The Transport Network Reconstruction Program (TNRP) Design Guidelines will be discussed. Examples of repair and reconstruction works carried out in the Toowoomba area will be provided.

## **5.2 Limitations of this Section**

This section is intended to provide the technically based background of a road network system and the techniques used by council in order to render the road network system into a safe and serviceable condition. This section is not intended to be a comprehensive information resource regarding the making of roads.

## **5.3 Toowoomba Regional Council – Road Infrastructure**

Toowoomba area is locally governed by the Toowoomba Regional Council (TRC) and covers an area of 12,973 square kilometres on the Darling Downs of South East Queensland. Toowoomba city is located on the western edge of the Great Dividing Range about 700 metres above sea level and has the major highways of Warrego Highway, Gore Highway and New England Highway converge within the city boundaries. Toowoomba region has 9,650 kilometres of road network systems which are the responsibility of either the TRC or Department of Transport and Main Roads.

TRC assets and infrastructure are in the form of property, plant and equipment, the majority of which is infrastructure such as roads, drainage, water and wastewater facilities. These form 92% of the council asset base which has a net value of \$3.2 billion. TRC spent \$59.2 million on assets and infrastructure within the TRC area during the financial year of 2009/2010

Of the 9,650 kilometres of roads, 3,329.6 kilometres are sealed, 3,022.5 kilometres are gravel roads and 430.3 kilometres are formed roads. TRC also controls 2,868 kilometres of unformed roads.

TRC is committed to maintaining, improving, upgrading and constructing infrastructure to provide well maintained infrastructure and services for the people of the region. Toowoomba city and the Toowoomba area is an important link in the national, state, regional and local transport system.

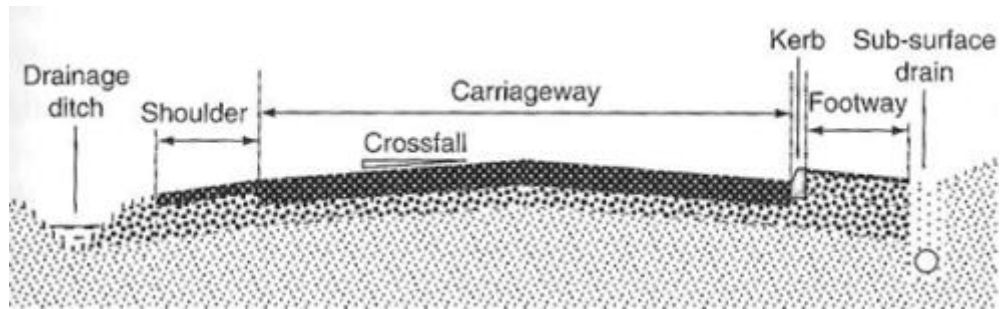
The wet season of December 2010 had already caused localized flash flooding and damage to TRC assets and infrastructure. The storm that fell over the region on 10 January 2011 caused massive damage to the road network system in Toowoomba area and Toowoomba city itself. Flood damage along the creek systems in Toowoomba caused extensive damage to roads, bridges, and road furniture; saturating the road foundations causing further damage. Huge damage occurred to both public and private property.

#### **5.4 What is a road**

For a description of the road network system this report will utilize the definition supplied by the Department of Environment and Resource Management, Queensland (DERM). DERM provides a definition of a road as ‘Land designated as road is an area set aside for the present or future use of the travelling public.’ (DERM 2010, P1)

The legal definition of road is land, surveyed or un-surveyed that is ‘dedicated, notified or declared for public use’. The definition of ‘road’ relevant to this report includes street, highway, pathway, thoroughfare, track, bridge, causeway, culvert, other works in, on, over or under a road. A road is the land that goes from one property boundary to the property boundary on the other side whether it is constructed or not. (DERM 2010, P1)

This report will restrict the description of damage to the road network system that affected sealed carriageways only. Damage to other parts of the road are beyond the scope of this report. Refer to Figure 13 for Typical Road Cross Section.



**Figure 13 Typical Road Cross-Section**

(Sourced: Thom 2008)

## **5.5 Basic Construction of Sealed Roads or Carriageways**

Road pavements are divided into three classes – flexible, rigid and composite. A rigid pavement is one constructed of a rigid material such as a concrete slab; a flexible pavement is primarily constructed of a granular material bound by asphalt; and a composite pavement has a combination of asphalt surface overlaying a hydraulically mixed base.

### **5.5.1 Hydraulically Bound Material**

Hydraulically-bound material refers to road material binders that require water to activate the binding process. Examples are Portland Cement, fly-ash and blast-furnace slag and are referred to as Pavement Quality Concrete (PQC). These binding agents are mixed with water and various granular materials of different grades to form a rigid, stiff surface with high tensile strength. Refer Figure 14 (Thom 2008)

### **5.5.2 Bitumen Bound Material**

Bitumen-bound material refers to road material binders which are petroleum based products that are combined with granular materials to form a flexible road surface which is resistant to deformation under repeated load, and has the required stiffness and fatigue characteristics to overcome cracking issues that can be present in hydraulically bound materials. Bitumen bound materials are referred to as ‘asphalts’ in transport engineering and are extensively used for pavement construction. Refer Figure 14 (Thom 2008) Asphalt pavement will be the focus of this report because of the prolific use within the TRC.

### 5.5.3 Granular Material

Granular material is an engineered product used in road construction and includes natural gravel, crushed rock and granulated industrial by-products such as slag from steel production furnaces or old road profiling. The granular material forms the base of the road construction process and is mixed with water and compacted to form a solid foundation. This layer is also susceptible to water damage; but the behaviour is more predictable. The properties of the granular material are measured according to stiffness and shear resistance. Refer Figure 14 (Thom 2008)

### 5.5.4 Sub-Grade – Soil

The soil structure that is underlying a road is a very important but uncertain material. Soil structures can vary significantly along and across a road in a relatively short area. Soil structure can be hard rock, clays, silt and sand; and these can be permeable and impermeable. Soils are sensitive to water content and the extent of this sensitivity varies significantly depending on the situation. These variations in soil content contribute to the uncertainty in the road construction process. Despite this, various soil testing is undertaken to attempt to realistically define their properties exhibited under stiffness, resistance to deformation and sheer strength. Soil structures contribute to the type and extent of damage caused by saturation during flooding or extreme rainfall events. Refer Figure 14 (Thom 2008)

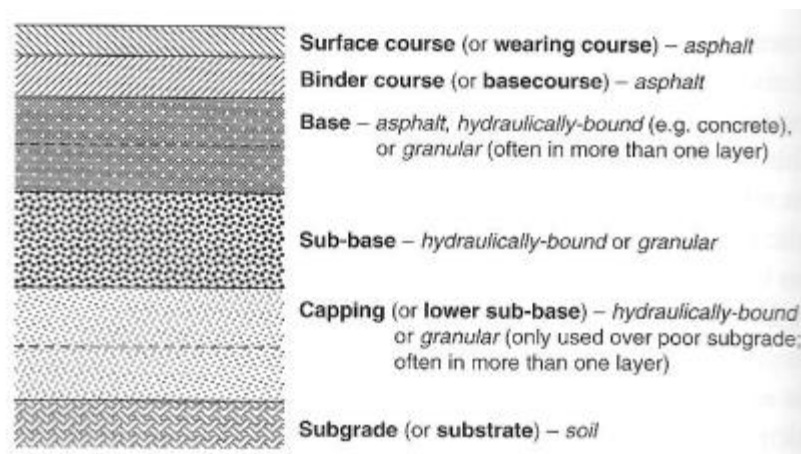


Figure 14 Pavement Layers Terminology

(Sourced: Thom 2008)



## **5.6 Pavement Damage Caused by Water**

Moisture content is a critical component within road construction. Specific levels of water are required to achieve optimum compaction and therefore a sound foundation of the road surface. However, from a road maintenance perspective water intrusion is extremely detrimental to the road structure - the sub-grade, the road base and the pavement surfacing. On sealed surfaces saturation of water can cause extensive damage. Water can enter small cracks within the bitumen and be absorbed by the aggregate material, weakening the aggregate bitumen bond and therefore increasing the propensity for bitumen cracking and other water related damage such as break-out. The addition of traffic to a saturated road surface further exacerbates the damage. The additional loading on the road surface by the vehicles induces increased pore water pressure within the road and forces water into the voids further penetrating the road foundations and thus weakening the soils. Damage is evident in the formation of rutting and stress cracking along wheel paths. (Thom 2008)

TRC road network system has sustained the following types of damage as a result of the flooding during the wet season of 2010/2011.

1. Pavement breakout
2. Pavement crocodile cracking
3. Pavement potholing
4. Pavement rutting
5. Pavement stress cracking
6. Lifting/Loss of bitumen seal
7. Flushing of bitumen seal in wheel paths
8. Unsealed shoulder scouring
9. Flood debris to be removed
10. Scouring of bridge structures
11. Scouring /loss of culvert inlet/structure and protection works
12. Scouring /loss of gravel outlet sheeting material
13. Damage to floodway structures
14. Slope failures and instability
15. Embankment slump

The following illustrations have been accessed from page 15-16 TNRP document. (Note: Each illustration is numbered Figure 1 – 15 which corresponds to the above list of road damage.) Refer Figure 15,16 and 17 for illustrations of typical damage.



Figure 1 Pavement Breakouts



Figure 2 Pavement Crocodile Cracking



Figure 3 Pavement Potholing



Figure 4 Pavement Rutting



Figure 5 Pavement Stress Cracking



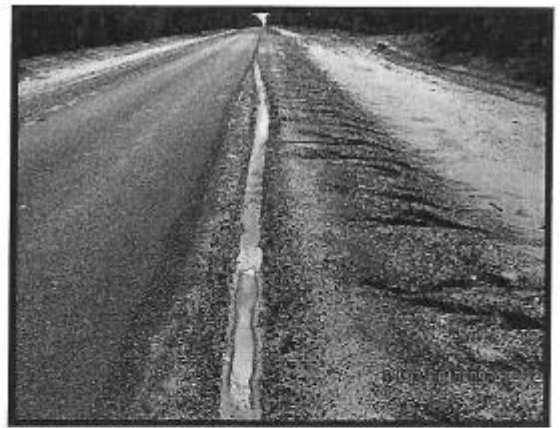
Figure 6 Lifting / Loss of Bitumen Seal

**Figure 15 Pavement Damages Part 1**

(Sourced: TNRP 2011)



**Figure 7 Flushing of Bitumen Seal in Wheel Paths**



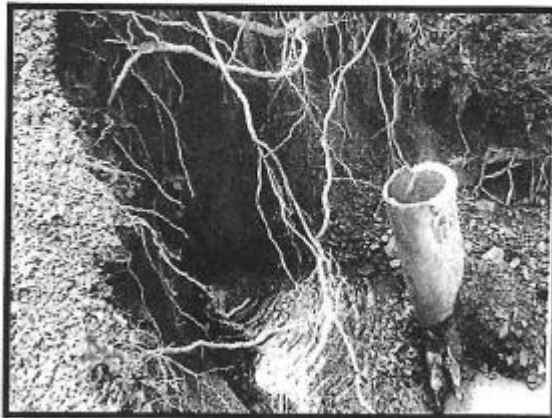
**Figure 8 Unsealed Shoulder Scouring**



**Figure 9 Flood Debris to be Removed**



**Figure 10 Scouring of Bridge Structures**



**Figure 11 Scouring / Loss of Culvert Inlet/ Structures and Protection Works**



**Figure 12 Scouring / Loss of Gravel Outlet Sheeting Material**

**Figure 16 Pavement Damage Part 2**

(Sourced: TNRP 2011)



Figure 13 Damage to Floodway Structures



Figure 14 Slope Failure & Instability



Figure 15 Embankment Slump

Figure 17 Pavement Damage Part 3

(Sourced: TNRP 2011)

## 5.7 Repair and Restoration Methods

Repair methods and design guidelines used by TRC for emergent works following the disaster event of 10 January 2011 will now be discussed. Design Guidelines Transport Network Reconstruction Program (TNRP) National Disaster Relief and Recovery Arrangements, authored by Transport and Main Roads Department, Queensland Government, provides the design framework and guidelines for technical personnel performing any design, construction or maintenance tasks on the road network system. This document also provides criteria for assessment of damage to roads. These guidelines use the current Queensland Design Standards such as the Road Planning and Design Manual (RPDM) and the Pavement Design Manual (PDM). Other cases where a relevant Queensland standard cannot be found, Austroads documents are applicable.

(TNRP 2011)

Most forms of repair are self explanatory, for example, erection of barriers includes erecting large fence-type barriers, concrete buffers, emergency tape, traffic cones and emergency road closed signage. Backfill refers to filling in scoured areas with appropriate fill material to stabilize the foundation. Pothole patching refers to a small gang placing a temporary repair in the damaged surface. (Thom 2008) There are a number of methods used. In the TRC area ‘emix’ or ‘coldmix’ is used for some temporary repairs. ‘emix’ or ‘coldmix’ is a bituminous material combined with aggregate, and when water is added a thermo-chemical reaction is triggering causing the material to harden and set. (Lembo, P 2011, pers. comm., February 2011)

The expression ‘mill and fill’ used by TRC maintenance personnel refers to a process called re-profiling which is a process where the damaged section of a road is excavated to remove damaged material. A milling or profiling machine is used to excavate to the required depth until a stable foundation is reached. Additional engineered material is applied to form road base, which is compacted and rolled. The surface is finished by applying a bituminous material usually asphalts. The majority of restoration works for damage sustained in the flood event would utilise the repair method of ‘mill and fill’. (Thom 2008)

### **5.7.1 Images of Road Restoration**

The following illustrations show typical damage sustained to sealed pavement surfaces on some Toowoomba streets during the flood event. The figures show the damage and then the restoration works that have been carried out by TRC. Figures 18, 19 and 20 show Mackenzie Street damage of rutting and crocodile cracking and the restoration works of ‘mill and fill’ carried out to repair the damage. Figure 21 and 22 show South Street with damage of pavement lift and the repaired surface. Figures 23, 24 and 25 show Teesdale Street with damage of rutting, flushing and stress cracking and the restoration works that were completed on this street. Figures 26 and 27 show pavement breakout on Anna Marie Street and the restoration work of ‘mill and fill’ to repair the damage. (TRC NDRRA Photo 2011)



**Figure 18 Mackenzie Street – rutting**  
(Sourced: TRC NDRRA Photo file 2011)



**Figure 19 Mackenzie Street - crocodile cracking**  
(Sourced: TRC NDRRA Photo file 2011)



**Figure 20 Mackenzie Street - restoration works - 'mill and fill'**

(Sourced: TRC NDRRA Photo file 2011)



**Figure 21 South Street - pavement lifting**

(Sourced: TRC NDRRA Photo file 2011)



**Figure 22 South Street - restoration - 'mill and fill'**

(Sourced: TRC NDRRA Photo file 2011)



**Figure 23 Teesdale Street - pavement flushing and stress cracking**  
(Sourced: TRC NDRRA Photo file 2011)



**Figure 24 Teesdale Street – potholing**  
(Sourced: TRC NDRRA Photo file 2011)



**Figure 25 Teesdale Street - restoration works - 'mill and fill'**  
(Sourced: TRC NDRRA Photo file 2011)





**Figure 26 Anna Marie Street - pavement breakout**

(Sourced: TRC NDRRA Photo file 2011)



**Figure 27 Anna Marie Street - restoration works - 'mill and fill'**

(Sourced: TRC NDRRA Photo file 2011)

## **5.8 Conclusion**

The effect of water on a sealed road surface has been reviewed. TRC is the local government body responsible for the road network system in the Toowoomba area and controls 9,650 kilometres of roads within that region. The events of 2010/2011 caused huge damage to the roads in the Toowoomba area. A road is described as the land that extends from one boundary to the other, but the focus of this report was the carriageway which is the part of the road that vehicles travel on. The TNRP authored by the Transport and Main Roads Department, the RPDM and the PDM are the guidelines available to give current standards and specifications for road design, construction and maintenance to technical staff responsible for repair and reconstruction of the road system. A basic description of road pavement was given and the types of material used to construct roads. Water is necessary in the construction of roads but water can have detrimental effects and cause damage to road infrastructure. Typical damage such as rutting, cracking and breakout was illustrated using illustrations from the Main Roads document TNRP. Typical repair methods were described including such methods as backfilling, pothole patching and a process called 'mill and fill'. Several illustrations of damage sustained on some Toowoomba streets during the flood event of December 2010/January 2011 and illustrations of the restoration works that have been carried out by TRC were presented.

## **Chapter 6 – Funding Strategies**

### **6.1 Introduction**

A discussion regarding the funding programs available to local government bodies for emergent and reconstruction works following a natural disaster event. Government programs for assistance such as the Natural Disaster Relief and Recovery Arrangement (NDRRA), the Queensland Reconstruction Authority (QRA), the Queensland Disaster Relief and Recovery Arrangement Guidelines 2009-2010 and the Transport Network Reconstruction Program Design Guidelines (TNRP) will be discussed. The new QRA Submission Guide will be discussed. The processes followed by Toowoomba Regional Council to apply for funding will be discussed.

### **6.2 Background to Funding**

Following the flooding disaster of 2010/2011 wet season which resulted in huge damage to public and private property local governments had to organise themselves to deal with emergent and reconstruction works to restore their communities to efficient and safe environments. It is the responsibility of the government at all levels, federal, state and local, to manage the situation and restore the affected communities to a pre-disaster state. How well the disaster is managed dictates the time taken for the community to fully recover. Thus, it is important for disasters to be managed correctly and efficiently to prevent further economic and social disadvantage to the community. TRC is the local government body responsible for the emergent and reconstruction activities within the Toowoomba region to restore this area to pre-flood conditions.

TRC assets and infrastructure make up the majority of council's fixed assets which were damage during the flood event. These were in the form of property, plant and equipment, the majority of which is infrastructure such as roads, drainage, water and wastewater facilities. These form 92% of the council asset base. The net wealth of TRC as at 30 June 2010 was \$3.2 billion. (Annual Report 2009 – 2010)

TRC region covers an area of 12,973 square kilometres. TRC controls 9650 kilometres of roads of which 3,329.6 kilometres are sealed, 3,022.5 kilometres are gravel roads and 430.3 kilometres are formed roads. TRC also controls 2,868 kilometres of unformed roads. TRC recognises that the area is an important link in the national, state, regional and local transport system. (Annual Report 2009 – 2010)

The event on Monday 10 January 2011 resulted in TRC activating their Local Disaster Management Group and the Local Disaster Coordination Centre to cope with emergent situations. Following this a task force was set up to assess damage from the event and to investigate and access funding to finance emergent and reconstruction programs.

Funding that local government can access include the NDRRA program administered through the QRA, and the TNRP for guidelines for accessing NDRRA funding and funding for Resilient and Complementary Works. (NDRRA Guidelines 2009 - 2010)

### **6.3 Natural Disaster Relief and Recovery Arrangement**

The Natural Disaster Relief and Recovery Arrangement the Natural Disaster Recovery and Relief Determination 2007, and the Natural Disaster Recovery and Relief Determination 2011, collectively referred to as NDRRA, is the federally funded financial scheme administered by the Attorney-General's Department to provide financial assistance to local councils for restoration of infrastructure and public assets following a natural disaster. The program is based on the terms and conditions in the NDRRA Determination 2007 and has since been up-dated to NDRRA Determination 2011. It covers such events as bushfire, earthquakes storms, floods, cyclones, storm surge, landslide, tsunami, meteorite strike, and tornado; but does not apply to drought, frost, heat-wave, epidemic and some other disaster events. (NDRRA 2007)

The NDRRA is a Federal Government program which is now administered in Queensland by the Queensland Reconstruction Authority. This finance is provided to restore local communities to a pre-disaster condition and does not cover such things as realignment of roads, raising of bridges, additional signage as these works are considered improvements and as such come under Resilient Works or Complementary Works funding. A State or Territory may claim NDRRA funding if a natural disaster occurs, the event exceeds \$240,000 and the State or Territory notifies the Attorney-General's Department of the event. (NDRRA Determination 2011)

### **6.4 Queensland Reconstruction Authority**

The Queensland Reconstruction Authority (QRA) is the authority created to manage the reconstruction and recovery of Queensland following the extreme disaster situation that occurred during 2010/2011 wet season. The Queensland Reconstruction Authority (QRA) Act 2011 of February 2011 is the legislative instrument under which the Queensland Reconstruction Authority operates. The Act defines the disaster event and

establishes criteria for eligibility for organizations such as TRC to obtain assistance for road works. QRA collects information and data and establishes priorities for community infrastructure and community services needed for protection, rebuilding and recovery. The controlling members of QRA must have expertise in engineering, finance, planning or other fields deemed necessary as applications for funding from councils such as TRC for emergent and restoration works are assessed by this department. Several other QRA documents provide information regarding reconstruction. The documents outline timelines, phases of recovery, and methods of implementation and terms of agreement for funding. (QRA 2011)

### 6.5 Queensland Disaster Relief and Recovery Arrangement Guidelines

The Disaster Relief and Recovery Arrangements Guidelines 2009 – 2010 V 1 (NDRRA Guidelines) document outlines the government funding available at the time of the disaster events during the wet season of 2010 and 2011. This document provides all the information required for funding applications for local government to obtain funds for relief and recovery during and after a disaster. (NDRRA Guidelines 2009 - 2010)

This document identifies that the funding for restoration of roads and network systems will come from NDRRA funding program which is now administered by QRA. Application forms illustrated in the appendix of this document have been slightly changed due to the establishment of QRA, however format and information required is still the same. (NDRRA Guidelines 2009 - 2010)

<p><b>Economic Support</b></p> <p><u>Concessional Loans for Primary Producers</u> (NDRRA)</p> <p><u>Concessional Loans for Small Business</u> (NDRRA)</p> <p><u>Freight Subsidies for Primary Producers</u> (NDRRA)</p>	<p><b>Natural Environment</b></p> <p>NOT available under standard SDRA and/or NDRRA</p>
<p><b>Essential Public Infrastructure (Built Environment)</b></p> <p><u>Restoration of Essential Public Assets</u> (NDRRA)</p>	<p><b>Social Support</b></p> <p><u>Disaster Relief Assistance Scheme</u> (NDRRA and SDRA)</p> <p><u>Counter Disaster Operations</u> (NDRRA and SDRA)</p> <p><u>Associations Natural Disaster Relief Scheme</u> (NDRRA)</p>

**Figure 28 Funding Guide**

(Sourced: NDRRA Guidelines 2009-2010)

The above Figure28 provides a guide to the funding available under the NDRRA program. The anticipated delivery of the NDRRA funds for the 2010-2012 time period by sector is 20% to Councils, 30% to Road Tek and 50% to the private sector. Applications for disaster recovery funding from NDRRA for Essential Public Infrastructure (Built Environment) is submitted through QRA. ( NDRRA Guidelines 2009 - 2010)

## **6.6 Queensland Reconstruction Authority Submission Guide**

QRA have produced Queensland Reconstruction Authority Submission Guide Version 3 for NDRRA Funding Applicants which was published during August 2011. This guide is in response to the need that has arisen because of the events that have been occurring in Queensland 2010/2011. This guide will assist applicants to prepare the application forms and understand the requirements of eligibility, reporting of progress and completion, and provide a guide for the requirement of a value for money statement to be supplied for the projects that receive funding. Templates of application forms for use by local government to submit claims for funding under this program are illustrated in this guide. These forms provide the capability for applicants to supply all the relevant information for a successful application. Councils must provide all required information, the project must fulfil NDRRA eligibility criteria and the Council must provide a value for money statement for the project. (QRA Submission Guide 2011)

Refer Appendix H for examples of the Submission Forms (6 forms) .

## **6.7 Criteria for Eligibility for NDRRA Funding**

NDRRA Guidelines state:

*'Policy provides provision for the restoration of essential public assets to pre-disaster standard/level of service, in accordance with current engineering standards/requirements and building codes/guidelines, while maintaining the same asset class and/or asset immunity level.'*

(NDRRA Guidelines, 2009-2010, p 3)

Since July 2009 changes had been made to include road base saturation and road drainage system restoration as eligible for NDRRA funding. (NDRRA Guidelines 2009-2010)

NDRRA funding will not cover such items as realignment of roads, raising of bridges, additional signage. Funding from TRNP projects would cover these items as either Resilient Works or Complementary Works with the funding then coming from TMR. (TNRP 2011)

Emergency works must be completed within 60 days of the disaster event and the forms must be lodged within 6 months of the activation date. Reconstruction works must be completed within a 2 year time span from the activation date. These timeframes can be extended under exceptional circumstances subject to approval by the appropriate authority. (NDRRA Guidelines 2009 - 2010)

## **6.8 Design Guidelines Transport Network Reconstruction Program**

Design Guidelines Transport Network Reconstruction Program (TNRP) is the document produced by the Department of Transport and Main Roads Queensland (TMR) to provide the design framework for the transport network reconstruction program. The TNRP was developed because of weather events 2009 to 2011 which caused extensive damage to road infrastructure controlled by Department of Transport and Main Road (TMR). This program also manages funds available through NDRRA program. (TNRP 2011)

This document provides the guidelines for technical personnel to follow when performing any design, construction and maintenance tasks on the road network system. It provides the technical guidelines for reconstruction to current engineering standards and requirements. This document provides criteria for assessment of damage to roads. It also provides examples of what type of damage is eligible through NDRRA funding and a description of additional works which are referred to as 'Resilient Works' or 'Complementary Works' which is funded by TMR. (TNRP 2011)

These guidelines use the current Queensland Design Standards such as the Road Planning and Design Manual (RPDM) and the Pavement Design Manual (PDM). Other cases where a relevant Queensland standard cannot be found, Austroads documents are applicable. ( TNRP 2011)

## **6.9 Access of Funding by Toowoomba Regional Council**

TRC set up a task force to complete road assessments and applications for funding for emergent and reconstruction works. The Engineering Services department is administering this process under the leadership of Mr Andrew Volpato. When the process first started all forms were on NDRRA application forms. Now, as referred to above, the forms are submitted on QRA forms. The NDRRA Guidelines are the current guidelines being used by TRC. (Volpato, A 2011, pers. comm., 25 August)

Soon after the event all the districts of TRC assessed their roads and submitted estimate claims. The damage estimations of \$85million which were initially published were inclusive of emergent and reconstruction works and were completed while some areas were still inundated by flood waters and were estimated on a “best guess” basis. This estimate was completed and submitted about March 2011 to the newly formed QRA, and TRC received about \$8m of preliminary funding. In September 2011 current figures released by TRC establish the damage to be approximately \$174million. (Volpato, A 2011, pers. comm., 29 September)

## **6.10 NDRRA Application Time Limits**

TRC has combined all NDRRA/QRA claims for disaster relief from the wet season of 2010-2011 into one claim with a disaster activation date of 30<sup>th</sup> December 2010.

Thus important dates were:

1. Emergent works were to be completed by end of February 2011 (i.e. 60 days from 30 December 2010 to 28 February 2011):
  - a. Extension was granted through Emergency Management Queensland for TRC to have until the end of May 2011 to complete emergent works.
  - b. Self imposed deadline for completion of emergent works of 15<sup>th</sup> April 2011 which was achieved.
2. Emergent Claim was to be completed by end of June 2011 (i.e. 6 months from activation date of 30 December 2010)
  - a. Submission was achieved by 30<sup>th</sup> June 2011.
3. Restoration works to be completed within 2 year of the activation date (i.e. 30 December 2010):
  - a. In progress



4. Restoration Claim was to be completed by end of August 2011:
  - a. Self imposed timeframe can be extended within the council administration system.
  - b. Restoration claim is progressing within the management system.
  - c. Claims will not be finished within the project submission time.

(Volpato, A 2011, pers. comm., 29 September)

Note: Timeframe for completion of restorative works is now June 2013 (Byrnes J, 2011, e-mail, 12 October)

### **6.11 TRC Management Response for applying for funding**

Immediately after the disaster TRC staff were commissioned to assess the damage that had occurred on the road network system within the Toowoomba region and log the data onto the spreadsheets used by the construction and maintenance section. The spreadsheets have the following titles:

Guidelines, Summary, Multi Site, Specific Site, Emergent Work, Task Listing, Resource List, Unit Rate Setup, Culvert Costs, Road Data, Lists, Temp Multi Site Estimate, and Initial data.

The Guideline section explains the system including details of how to fill in the sheets, specifically, what is required for a description of the damage, who will use the spreadsheets and their destination indicates how the information will be used, and there is a system for establishing priority. The system has the ability to attach photos of the damage. These spreadsheets were circulated to district data collectors, the district estimator, engineers, works coordinators, data collection departments and NDRRA Submission department. This system provided the personnel with the ability to fill in all the information that would be necessary to fully describe the damage, repair methods, resources needed, cost analysis, and illustrations. Staff were sent out into the field to take photos and log the data. (Toowoomba District Template V16, TRC, 2011)

### **6.12 Analysis and Evaluation**

Improvements and recommendations to increase the efficiency of the data collection and funding application process will now be discussed.

### **6.12.1 Spreadsheets**

The spreadsheet system was the data collection system being used to collect and collate flood damage data during the recovery phase. There is now too much information collected to work off the spreadsheets and it is important to move this information onto a database. A database system, Asset Maintenance Management system, is being developed for this information to be collated in to which will record all road conditions. A section will include 'specific damage', so that in future all types of damage, including flood damage, will be easily filtered. (Byrnes J 2011, email 11 October)

### **6.12.2 Ambiguous Processes**

Initially the complexities of the funding program including the relevant legislation, eligibility criteria and the application process itself presented problems. The general assumption of council was that TRC staff had previous experience in dealing with emergencies and making claims for funding under the NDRRA system, as flooding events were an annual occurrence in the region as were NDRRA applications. The experienced personnel felt they knew the processes. However, the ambiguities within the application process, the scale of this event, and the need to report consistently across the region has created problems. (Byrnes J, 2011, e-mail, 12 October) QRA has addressed this problem to some extent by issuing Queensland Reconstruction Authority, Submission Guide Version 3 for NDRRA Funding Applicants during August 2011. (QRA Submission Guide 2011)

### **6.12.3 Lack of Knowledge**

The assumption that prior knowledge of the NDRRA system existed within TRC resulted in very little training being provided. Only a number of one on one training sessions were carried out. Thus resulting in field staff entered data 'the way they felt was correct' or 'the way they have been previously instructed to do so.' (Byrnes J, 2011, e-mail, 12 October) This resulted in problems such as:

- Lack of consistency with road assessment and data collection and entry.
- Lack of accuracy when recording data. For example, someone using a car odometer can only be accurate to 50 metres whereas a handheld odometer is more accurate.
- Incorrect use of GPS camera, or retrospectively logging chainages using e-view (Deko). This lead to huge mistakes in accuracy and errors in data inputs.

- A GPS camera is only accurate to within 5 metres which created errors in logging process and it sometimes logged a different street.
- This led to laborious manual correction in Excel program.

#### **6.12.4 Inexperienced staff**

Data collection was performed by engineering interns or practical students and various other technical staff based in construction and maintenance. Submission forms were completed by practical students.

The use of engineering interns or practical students raised several issues. These people are reasonably inexperienced with such a complicated program as NDRRA and it was difficult to obtain assistance or training regarding what was required. Robbins et al discusses that a lack of training can lead to a reduction in motivation and productivity, together with an increase in counter productive workplace behaviour such as reduced performance, sick-leave or work-place turnover (Robbins et al, 2008). This does not mean that TRC employees were performing poorly, it merely presents the general theoretical view on how a lack of training effects organisational behaviour of staff. Furthermore, it emphasises the importance of training in performance management and efficiency.

#### **6.13 Recommendations**

It is now acknowledged that a massive training exercise is necessary when a disaster of this nature occurs. Training should include all aspects of the situation to ensure staff know what is expected of them, why and how to do it. (Byrnes J, 2011, e-mail, 12 October ) The need for training is widely acknowledged. Fry N (2011) stated that there is currently a state-wide program to train disaster management staff.

Training and development programs and policies are an essential component of any organisation to cope with a changing organisational environment, new technologies and methods, and new trends in organisational management. The disaster situation posed an increased difficulty in addition to an already changing work environment. This increased stress within the workplace. Training helps to alleviate these factors and has other positive benefits such as increased efficiency and the capability to do the job well. (Tovey et al 2006) Cost is always a factor to be considered within local government thus training programs must be able to be evaluated to ensure they achieve the desired

outcomes. Thus a full needs analysis would be required to identify learning outcomes that need to be achieved and provide a benchmark for the training process. (Tovey et al 2008) It is recognised that the very nature of a disaster prevents a training program during the event and this highlights the need for disaster management planning and preparedness.

Increased training and team meetings for the data collection staff would have provided the opportunity to share information, get feedback and increase knowledge of the 'bigger picture' of the job. This would also foster a feeling of 'ownership' and pride in the job and increase organisational citizenship. (Robbins et al 2008)

Other issues that could be subject of training sessions could include an overview of the disaster legislation, guidelines and procedures, eligibility and criteria, including a coordinated map of the district which illustrated the regions and program. Training sessions such as these would ensure personnel could feel that they understand their job and what is required of them and could improve job satisfaction and therefore productivity (Tovey et al 2006)

A 'survival pack' or 'information kit' for practical students that expands on the existing induction process. i.e. how to access procedures and guidelines, management systems specific to the council, a glossary of jargon, and departments. Practical students who are new to the workforce would then have the tools to get the information they need and their 'first job' experience would be a more positive and efficient experience (Robbins et al 2008).

## **6.14 Conclusion**

Funding programs for disaster recovery have been discussed. The NDRRA is the federally funded program to provide assistance to local government bodies for emergent and reconstruction programs following a disaster such as the event that occurred during the 2010/2011 period. This funding is administered in Queensland by the QRA and the NDRRA Guidelines 2009 – 2010 provide the guidelines for eligibility and other criteria that must be fulfilled for councils to receive funding under the program. Further guidance regarding technical design and standards is provided by the Department of Transport and Main Roads document TNRP 2011. TRC applied for funding for emergent works within the specified timeframe and have completed the emergent

works. The restorative phase is an ongoing process and has until Jun 2013 to be completed. The data collection and funding application process is undergoing ongoing analysis and evaluation to improve funding application processes. Training has been identified as a recommended improvement in the system.

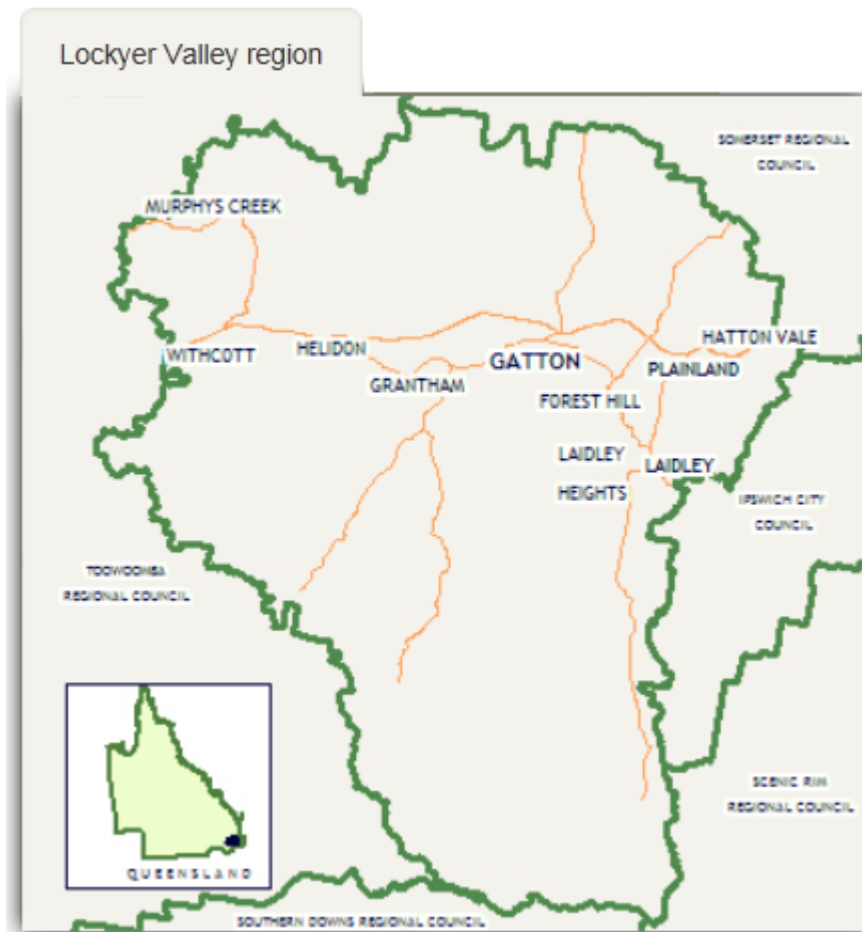
# **Chapter 7 – Review of Lockyer Valley Regional Council Emergent Response**

## **7.1 Introduction**

This chapter will review the Lockyer Valley Regional Council's (LVRC) emergent response to the flash flooding event which occurred on 10 January 2011. A description of the area will be presented and an overview of the LVRC's organisation and structure. A description of the event and typical damage sustained will be provided. The emergent response from the council will be reviewed. The Queensland Flood Commission of Inquiry findings relevant to the Lockyer Valley situation will be reviewed.

## **7.2 Background**

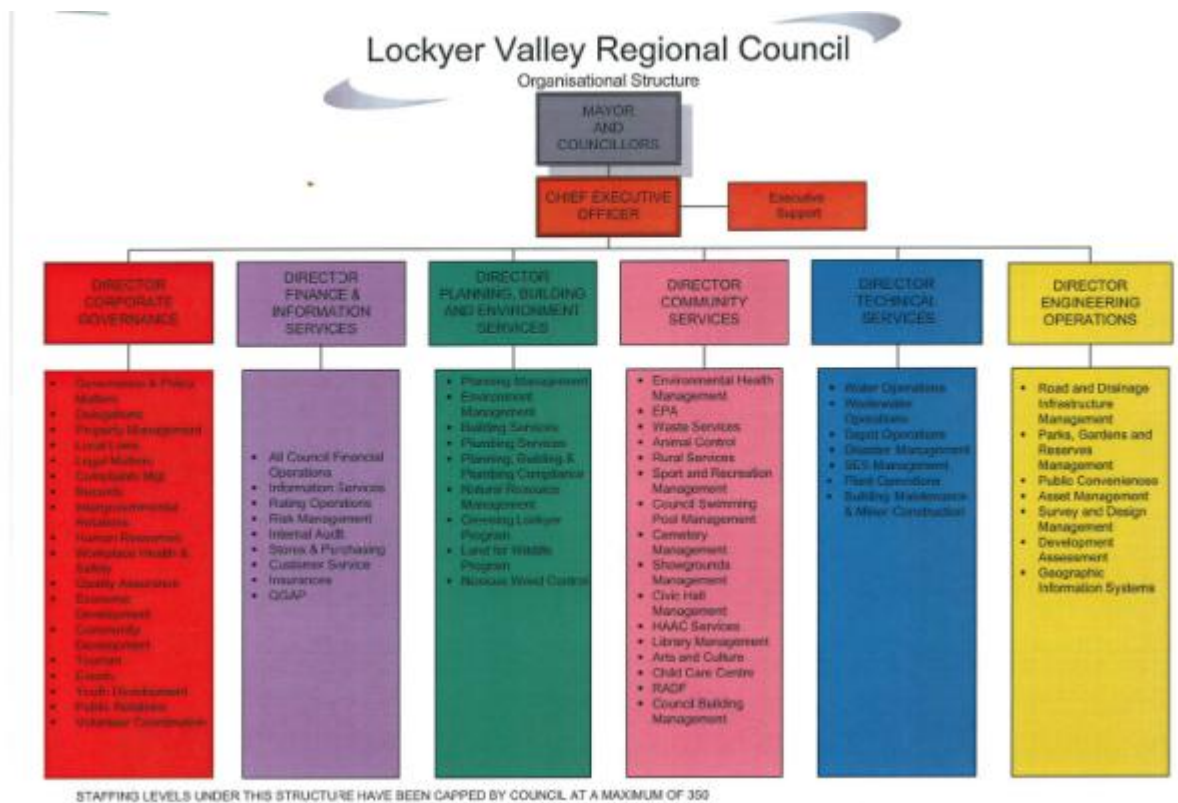
The Lockyer Valley is located approximately one hour drive west of Brisbane City in South East Queensland. The LVRC is the local government body that governs this area of 2,272.3 square kilometres. It is a rural area of farmland, small regional towns and small hamlets. Gatton township is the headquarters of the LVRC offices. The University of Queensland Gatton Campus and a new correctional facility are located within the LVRC area. Population of the council area is 36,591 people. The Lockyer Creek and its tributaries constitute the main river system flowing throughout the valley with a catchment area of 2,600 square kilometres. The main towns in this area are Murphys Creek, Laidley, Helidon, Withcott, Grantham and Gatton. (Queensland Flood Commission of Inquiry 2011) Refer Figure 29 Map of Lockyer Valley Region.



**Figure 29 Map of Lockyer Valley Region**

(Sourced: LVCRP 2011)

The LVRC is the local governing body responsible for the Lockyer Valley region and, as in Toowoomba, had been going through an amalgamation process of combining smaller council regions into a larger body. LVRC consists of what was the old areas of Gatton Shire Council and Laidley Shire Council. The LVRC has an elected Mayor and six councillors and the council has a staff of approximately 340 to 350 personnel headed by the Chief Executive Officer. About half of these personnel were available over the Christmas/New Year period when the disaster occurred. The LVRC has a similar organisational structure as TRC with six main departments one of which is the Engineering Department which was the department responsible for disaster planning. Engineering Operations Department is also responsible for planning and programming capital works, maintenance of council roads, drainage and parks. The organisational structure is provided to illustrate an authoritative chain of command for road repair from the CEO to the Engineering Department and to Construction and Maintenance. (LVRC Annual Report 2009-2010)



**Figure 30 Organisational Structure of LVRC**

(Sourced: LVRC Annual Report 2009-2010)

### 7.3 Event and Damage

On Monday 10 January 2011 the storm cell that shed rainfall on the eastern side of the Toowoomba watershed coursed down the ranges into the Lockyer Creek catchment area. Like Toowoomba area, the Lockyer Valley had also been experiencing unprecedented rainfall and the catchment was in a saturated condition. In the Lockyer Valley the inundation swept people and vehicles away in flooding waters, and inundated homes, businesses and farmland. The volume and speed of the water took everyone by surprise. Emergency services were immediately activated with helicopter rescue teams and emergency services attending to rescue of people. Deaths were sustained in this event in the Lockyer Valley and all the people of the valley were affected in some way by this event. (LVCRP 2011)

The towns and localities most immediately affected by the flooding water were Spring Bluff, Murphys Creek, Postmans Ridge, Withcott, Flagstone Creek, Helidon, Grantham, Gatton, Forest Hill, Mulgowie, Laidley, Mount Sylvia, Black Duck Creek, Junction View, East Haldon, Glenore Grove, Crowley Vale, Brightview, Regency Downs and



Lockrose. Postmans Ridge, Murphys Creek and Grantham were the small communities most severely affected by the floods with tragic outcomes. (LVCRP 2011)

The extent of the devastation and damage was evident and could be seen by all – creeks and watercourses scoured by water, inundated agricultural fields, houses and businesses swept away, and flood debris left everywhere. As at 23 February 2011 800 cars had been lost and over 120 homes swept away or left unsound for habitation. (LVCRP 2011)

## **7.4 Lockyer Valley Regional Council Disaster Management**

### **7.4.1 Lockyer Valley Disaster Management Plan**

After the 2008 amalgamation of smaller councils into LVRC a local disaster management group was set up and during September 2009 LVRC formally adopted a local disaster management plan and appointed a Local Disaster Management Group (LDMG) chaired by the mayor. The chair attended a Local Government Association of Queensland conference during May 2010 and LVRC then became aware of changes that would be occurring within Emergency Management Queensland (EMQ) that would affect disaster management at the local council level. (QFCI 2011)

LVRC began to work on revision of disaster preparation and management processes. In July 2010 the engineering services department was made responsible for disaster planning, the head of that department became the local disaster coordinator (LDC) and a disaster management working group was formulated. A member of the working group stated on 22.9.2010 that not much was done to improve LVRC response capability and disaster planning since 2008. (QFCI 2011)

The LDC, Engineering Department, attended meetings during late 2010 regarding disaster planning and council participated in a practise exercise in November 2010 simulating a major flood event. It was noted that council needed to work on their plans to get them ‘up to speed.’ The budget was then amended to include finance to address issues of disaster management including establishing a control centre. (QFCI 2011)

A draft plan with minor changes to the September 2009 plan was presented to council in October 2010 and this situation remained the same during December 2010. During December 2010 the LDMP was still not approved by council, but a final version was

produced on the 6 January 2011 and formally ratified on 23 February 2011. (QFCI 2011)

During December 2010 when weather patterns delivered high rainfalls to the area, the LDMG advised members regarding possible activation, sandbag availability, contact numbers for road blockage issues, and location of a DCC if needed. This potential risk was seen to have dissipated by 5 January 2011. At the time of the event LVRC had no formal evacuation centres other than the Gatton hall which many residents affected by the flooding waters and left without food or shelter could not reach. (QFCI 2011)

#### **7.4.2 Immediate events leading to the flooding of local communities**

During December 2010 and early January 2011 the LDMG and the DCC were activated a number of times to deal with events of flooding. The 27 and 28 December 2010 flooding, the 6 January 2011 flooding, and then 7 January to 9 January 2011 flooding necessitated the activation of the LDMG and DCC. Some residents from Grantham were evacuated on 9 January 2011 but were allowed to return home again. On 10 January 2011 the DCC closed at about 3.30am but it was again activated after about noon on Monday 10 January 2011. (QFCI 2011)

#### **7.4.3 Hydrological information**

The following information describes the times, water levels and other data collected on the day of the disaster along the creek systems as the water rushed down its course in the Lockyer Creek system.

- Murphy's Creek – water rose 12 metres in 12 minutes about 1.45pm – by 2.51pm water had largely receded.
- Withcott – about 1.45pm to 2.00pm beginning to flood.
- Postman's Ridge – 2.00pm flooding.
- Helidon 2.20pm – two gauges – both failed –telemetry failed at 2.50pm, height 12.66 metres, ALERT failed at 2.53pm at 12.7 metres. DERM studies after the event had passed revealed a height of 13.88 metres at about 3.10pm.
- Grantham – flooding approximately 3.20pm to 4 pm. Insurance Council of Australia hydrologists found waters had been about 2 to 2.5 metres deep, rate rise of 12 metres per hour and would take 10 to 15 minutes to reach full depth. Estimated speed of water was 2 to 3 metres per second.

- Gatton - Telemetre gauge showed a water level rise of 7 metres at 5.00pm. Gauge failed at 7pm. BOM advised that water probably peaked at 8.00pm at 14.38 metres.
- On Tuesday 11 January 2011 significant flooding continued in Forest Hill, and Laidley.

(QFCI 2011)

#### **7.4.4 Emergent response**

As events of Monday afternoon began to unfold reports of ‘something happening’ began to disseminate around the community but there is no record of the LDMG being advised of the rising water. Emergency calls were eventually made and the immediate response was to rescue and search for missing people. Just after 4pm police communications directed helicopters to Grantham; leaving Archerfield at 4.28pm and arriving at Grantham by 4.48pm. Rescues of people from roofs and trees were performed, other people made their way to higher ground, and others were retrieved from homes by front end loaders. The people first congregated at the Grantham State School and were eventually evacuated to the evacuation centre set up at Helidon.

(QFCI 2011)

A personal interview was conducted with Mr Stephen Jones, Mayor of LVRC, on Friday 7 October 2011, and he stated that the initial response was very much a life and death situation. Jones stated that he was on his way to Withcott and was caught in the water himself but managed to get back to Gatton. As he passed through Helidon area he realised the severity of the situation. On arrival at Gatton the DCC was already activated and staffed. He then made his way driving a Mac tip truck and accompanied by 2 low loaders plus drivers to the Grantham area where he then continued for the next days with ‘hands on’ rescue work. (Jones, S 2011, pers comm., 7 October)

#### **7.5 Immediate and emergent response - other agencies**

The Emergency Management Queensland helicopter performed many rescues in Grantham township; Queensland Police Service and the Australian Defence Force (ADF) helicopters performed rescues in Toowoomba regions as well as Lockyer Valley (all of Forest Hill had to be evacuated to Gatton hall). Army trucks transported people from Laidley and Plainland area to safety. (QFCI 2011)

The search for missing people conducted by Queensland Police, ADF, Federal Police and SES covered an area of 663 square kilometres and 131 kilometres of creek line. Search helicopters, machinery for removal of debris, foot searches, air and boat searches were all necessary modes of search. (QFCI 2011)

## **7.6 Queensland Flood Commission Inquiry Interim Report**

The LVRC was criticised for a number of situations. Among other things it was said that LVRC failed to give warning, gave an inadequate response for smaller, isolated communities such as Murphy's Creek, and failed to identify and establish evacuation centres. (QFCI 2011)

S Jones (2011, pers. Comm., 7 October) said that the DCC had been activated just after 12 noon on 10 Monday 2011 with the LDC, Engineering Department, in charge. It was located in the Gatton council chambers and had the necessary equipment and phones. However, more comprehensive facilities would have been better as staff stayed at the centre working around the clock to handle the extent of the disaster. The DCC had an alternate power supply. The prioritisation of need for personnel and resources was 'field-based' and focused on saving lives and rescue.

### **7.6.1 Warnings Systems**

LVRC was responding to flooding events in Forest Hill, Laidley, Grantham and Withcott. Log entries on the afternoon of Monday 10 January 2011 in LVRC records and witness reports describes a fast moving situation and confusing description of events occurring in various locations across the region involving fast moving and fast rising water. (QFCI 2011)

The Commission report states that the DCC had been activated just after midday on 10 January 2011 and log entries and witness descriptions of events testify that the LDMG was 'trying to respond to flooding reports from numerous sources.' The Commission report also states 'The common experience was that no-one had time to do much before the water arrived; it was then a fight for survival.' The Commission found that the LDMG or the LVRC was not 'culpable for failing to recognise how dire the risk was, or to give such a warning.' (QFCI 2011)

### **7.6.2 Response to smaller isolated communities**

LVRC was unaware of Murphy's Creek situation until 12 January 2011 and permanent staff were allocated by 21 January 2011 but only in an administrative role; these personnel were unable to coordinate resources and personnel or act as a liaison point for the community. (QFCI 2011)

LVRC Mayor stated that he himself visited Murphys Creek when he became aware of what had happened there and council staff were sent to the area to assist. However, council resources were focused on search and rescue efforts and saving lives rather than providing food when other agencies were able to provide that resource and were doing so. (QFCI Lockyer 2011).

A witness observed that the LVRC 'was overwhelmed' with the magnitude of the event and this affected their response. Emergency Management Queensland suggested LVRC seek help from Murweh Regional Council who responded by sending five staff experienced in disaster management. This proved to be of great assistance to the LVRC. (QFCI 2011)

### **7.6.3 Evacuation Centres**

Evacuation centres were being established in many areas as the need arose. Some centres were LVRC instigated and some were started by communities in answer to their need. (QFCI Lockyer 2011)

### **7.6.4 Communication**

Communication was hampered by breakdown in telecommunications as landlines were down and mobile service is not always efficient in some of the areas experiencing flooding (QFCI 2011). S Jones (2011, pers. Comm., 7 October) stated that communication was very difficult as landlines had been washed away, power was cut and contact between each emergency area was very difficult.

## **7.7 Restoration Phase**

Within three days of the event every road within the council area was assessed using council resources, other agencies, community feedback, emergency personnel and equipment, e.g. helicopter assessment. The emphasis at this time was to restore road access on bigger roads by clearing debris and ensuring safe access. Emergent works had been completed within two to

three weeks so most residents had access by this time. The more remote areas proved more difficult and 4WD access was restored for residents before the roads could be repaired back to normal. It was noted that within the LVRC twenty of the twenty-three townships sustained substantial flooding damage in this event. (S Jones 2011, pers. Comm., 7 October)

### **7.7.1 Lockyer Valley Community Recovery Plan**

The LVRC authored the Lockyer Valley Community Recovery Plan by 23 February 2011 as part of their emergent response to this huge disaster that occurred in the Lockyer Valley. This document was an attempt to inform the community, provide some basic instructions and directions, to acknowledge people's loss and to address the beginning of a recovery process. This document forms the 'basis for consultation' and was the written work of an organisation trying to make sense out of chaos for its community.

This plan has an inbuilt list with which the LVRC will measure the success of the recovery process. LVRC will:

- Establish various committees to oversee the process,
- Seek funding from various sources to become well-resourced and organised,
- Seek feedback from all sections of the community,
- Establish community centres,
- Maintain strategic alliances with other agencies,
- Identify and deliver relevant projects,
- Deliver community projects such as health and well-being programs,
- Establish community memorials.

(LVCRP 2011)

It is a requirement that all councils produce a Community Plan by Dec 2011. A Draft Community Plan will be released late September by LVRC and a final plan will be adopted by Council on November 23 2011. (LVRC Newsletter 2011)

#### **7.7.1.1 Website**

LVRC has established a Web site asking for responses from community regarding input into this community plan, and has circulated community letters and other media publications to involve community in the recovery and vision process.

### **7.7.1.2 Agency Relationships**

LVRC has developed working relationships to promote the process of recovery with federal and state agencies such as Major General Mick Slater Chair of QRA, the body tasked with the control of reconstructing Queensland, and Emergency Management Queensland, Toowoomba, Murweh Regional Council and SES. (LVCRP 2011)

### **7.7.1.3 Natural Disaster Relief and Recovery Arrangement Funding**

As in Toowoomba, the LVRC is eligible to apply for funding under NDRRA through QRA for finance to complete emergent and reconstruction works following a disaster. LVRC expects that funding for recovery from this disaster would come mainly from federal and state government level from this scheme. The Community Recovery Plan has identified a process for restoring the road network system which includes assessing damage, establishing plans and delivering, identifying and allocating funding from federal, state and other sources. LVRC acknowledges that while ordinary business of council may need to be re-prioritised the ordinary business of the community must continue to proceed as normal. (LVCRP 2011)

### **7.7.1.4 Criteria for Eligibility for NDRRA Funding**

There are certain criteria that must be fulfilled for works to be eligible for NDRRA funding.

*‘Policy provides provision for the restoration of essential public assets to pre-disaster standard/level of service, in accordance with current engineering standards/requirements and building codes/guidelines, while maintaining the same asset class and/or asset immunity level.’ (NDRRA Guidelines, 2009-2010, p 3)*

Road base saturation damage and damage to road drainage systems can now be repaired or restored with NDRRA funding; but NDRRA funding will not cover such items as realignment of roads, raising of bridges, and additional signage. (NDRRA Guidelines 2009-2010). Funding from TRNP projects would cover these items as either Resilient Works or Complementary Works with the funding then coming from TMR. (TNRP 2011) Emergency works must be completed within 60 days of the disaster event and the forms must be lodged within 6 months of the activation date. Reconstruction works must be completed within a 2 year time span from the activation date. These

timeframes can be extended under exceptional circumstances subject to approval by the appropriate authority. (NDRRA Guideline, 2009-2010)

#### **7.7.1.5 Assessment of damage and reconstruction work**

Aurecon, a major international engineering consultant firm estimated an initial repair bill of \$176 million with many assets such as sporting fields and community centres not assessed yet. About 80 % of LVRC road network system sustained damage with roads, sealed and unsealed, bridges, footpaths, causeways, earthworks, and culverts sustaining damage. Queensland Government road construction agency, RoadTek, and Aurecon have been contracted to assist existing council staff in assessment of damage and to complete applications for funding for emergent and restorative works. Reconstruction work is ongoing within the LVRC area and will be for some time into the future. For example, damaged infrastructure and repair work needs continual monitoring to assess the works as soil continues to respond to climatic conditions, e.g. drying out. (Jones, S 2011, pers. Comm., 7 October)

### **7.8 Analysis and Evaluation**

The Lockyer Valley was subject to a flooding event of huge proportions during 2010/2011. Even though the LVRC demonstrated some lack of preparedness the organisation responded well to an event that was of such proportions it required national assistance from all levels of government, other agencies and communities. This event will require some time to effect recovery and LVRC is putting effective systems in place to facilitate and promote community recovery.

#### **7.8.1 Flood Commission of Inquiry Interim Report**

The Queensland Flood Commission of Inquiry Interim Report made certain statements regarding the LVRC's response to the disaster event that occurred on 10 January 2011. The Flood Commission report states that the evidence suggests that there was little done towards disaster planning from 2009 and for some time after. Evidence showed there had not been meetings for 12 months, the management plan needed updating, the LVRC had not established a dedicated control centre, there was no contingency planning regarding sufficient personnel being available in the event of a disaster, and LVRC had no sub-plans for emergencies. (QFCI 2011)



It was noted by the Commission that LVRC was not the only council to have not fulfilled their responsibilities for Disaster preparedness and management legislated under the Disaster Management Act 2003. It was also acknowledged that the LVRC was not a 'wealthy or well-resourced council.' (QFCI, p235, 2011)

The Commission found that the LVRC did not meet the legislated responsibilities in that it:

- Did not conduct meetings within 6 monthly intervals;
- Did not review and endorse a disaster management plan quickly within a reasonable timeframe; and
- Did not organise an evacuation system: but

If the three points above had been fulfilled it would not have prevented the loss of life that occurred during the disaster event.

The Commission further noted that if LVRC had fulfilled their legislated responsibilities for preparedness and planning it would have helped their response capability. Uncertainty and extra stress had been caused to members of the community and extra workload and strain was placed on the council – its resources and personnel, and other support agencies at a time of emergency because of no pre-planned evacuation centres. Evacuation centres need essential services such as adequate water, food, shelter, facilities and equipment to cope with large numbers of people and these need to be carefully planned before an event. The need to establish local assembly points and facilities for evacuation centres with the ability to respond to an event for days or even weeks is recommended. It is also recommended to consider making these locations known to the public. The Queensland Flood Commission of Inquiry stated that it 'does not consider that the local disaster management group, or the LVRC, should now be regarded as culpable for failing to recognise how dire the risk was, or to give such a warning.' (QFCI 2011)

## **7.9 Conclusion**

It is concluded that the event that struck the Lockyer Valley on 10 January 2011 was a swift and disastrous event. The flooding event affected 20 out of the 23 townships in the area with widespread flooding, damage to property and public infrastructure and loss of life. LVRC is the local government body responsible for disaster management in the Lockyer Valley. The LVRC had prepared a LDMP in 2009 but had not done much about disaster management since that time and at the time of the event LVRC had only

one evacuation centre. The preceding flood events to 10 January 2011 caused the DCC to be activated, and on the day of 10 January 2011 the DCC was set up and managed the event with personnel also performing 'hands-on' rescues in several areas including the Grantham area where the most severe damage and loss of life occurred. The LVRC have instigated a recovery program. The LVRC performed emergent and reconstruction works and are applying for government funding for these works. The extent of the event in Queensland activated the use of government agencies such as the Australian Defence Forces and instigated the Queensland Flood Commission of Inquiry. The QFCI found that the LVRC had not fulfilled some of the legislative requirements for disaster management but had they done this, it would not have prevented any of the deaths that occurred. The QFCI stated that better disaster planning would have assisted their ability to respond and manage a disaster only. The QFCI found that the LVRC was not in any way responsible for failing to recognise the severity of the situation or to give warning. The LVRC has developed an ongoing recovery plan to bring the area back to full recovery.

## Chapter 8 – Conclusion

The disastrous 2010/2011 wet season had caused substantial damage throughout the state of Queensland leaving it with a sobering reminder of the powers of mother nature. For the TRC and LVRC the culmination of the disastrous wet season occurred on the 10<sup>th</sup> January 2011 where an unprecedented storm event caused rivers to break their banks, roads to be washed away, bridges to overtop, houses and people to wash away.

Toowoomba city experienced flash flooding along East, West, and Gowrie Creek catchment areas resulting in extensive damage and loss of life. The water that flowed down into the Lockyer Creek system caused a violent flash flooding event that took lives and caused severe damage to property in the Lockyer Valley, the most extreme case being the Grantham township.

A disaster declaration was announced on Tuesday 11 January 2011 by the Premier Anna Bligh. Defence personnel, emergency services, local government and local communities along with other agencies all worked together to carry out rescues and evacuations and then assisted with recovery efforts.

The aim of this project was to analyse and evaluate the response by TRC to repair and reconstruct the road network system following this event. It was proposed to investigate the emergent and short term restorative efforts and management system of the council. The scope of this project was limited to repairing sealed surfaces. The emergent response of LVRC was also investigated regarding their management of this event.

TRC had adopted a Local Disaster Management Plan, and had appointed a Local Disaster Management Group. A Disaster Coordination Centre had been dedicated and the equipment and facilities were adequate during the event. This centre is now relocated to a purpose-designed building in Little Street, Toowoomba. The DCC operated under Standing Operating Procedures during the event and this system was adequate. During the disaster period council's role and responsibility consisted mainly of ensuring community safety. The emergent works carried out consisted mainly of closing unsafe roads to public access by erecting barriers and signage, mill and fill of potholing, clean-up and clearing of debris and trying to restore public access.

During the emergent and restorative/recovery phase council appointed a workforce to assess road damage. Emergent works were carried out and completed by 15 April 2011 and applications for funding for these works have been submitted to QRA. The reconstruction phase is ongoing with completion date of June 2013 having been nominated by the authority. A system of spreadsheets is being used to collect road damage data and it is now holding a huge amount of information. A database is being developed which will have the ability to store all the information collected including being able to filter out specific damage such as flood damage.

A number of issues were identified during the event where improvements to the systems could be effected. Manual and hard copy recording of complaints, manuals, logs and reports will be continued to provide for the event of loss of power in an emergency or loss of internet or phone communication. CB radios will be re-installed in TRC vehicles to ensure communication is not lost and all personnel have access to information being circulated while an event is in progress. Training of staff will be carried out regarding technology and specific jobs for the DCC to ensure 24 hour rostering is possible. A new DCC has been established. The amalgamation of the smaller councils is seen as an advantage when managing a disaster but the importance of maintaining local disaster groups is very necessary. Some issues that will receive priority to be investigated include aligning other services regions with local council regions, and priority road-works within Toowoomba such as roads along the East and West Creeks requiring flood mitigation works.

The LVRC emergent response was reviewed as this council also sustained severe damage in the event. The LVRC was responding to numerous calls for assistance during this event and the council's role during the emergent phase was saving lives and rescuing people. Within three days of the event every road within the council had been assessed and the emphasis was on clearing debris and restoring access for the community. Within two to three weeks most residents had some sort of access with more remote communities getting 4WD access after some time. Twenty out of the twenty-three townships in the Lockyer region had sustained flooding damage. LVRC employed road engineering firm, Aurecon, and Queensland Government road construction agency, RoadTek, to assist council staff to complete road assessments, funding applications and works. LVRC has developed a recovery plan for the future

and is asking for community input and has included criteria within the plan for self-assessment.

The Queensland Government appointed the Queensland Flood Commission of Inquiry to investigate the events of 2010/2011. The QFCI interim report stated that TRC had correctly and appropriately fulfilled its responsibilities of disaster management preparation. The QFCI stated that LVRC had not adequately fulfilled the legislated requirements for disaster preparedness but that if it had this fact would not have prevented the loss of life that occurred in the event. The QFCI found that the LVRC was not culpable for failing to recognise how serious the situation was on the day.

It is concluded that the events of this time were of such proportions that a national response was required to manage the situation. It is concluded that both TRC and LVRC responding as the local governing bodies to the situations unique to their regions had adequate management systems in place to repair the road network system as quickly as possible. Both councils have analysed their systems and instigated recovery plans which include the recommendations of the QFCI.

### **Future Study**

The 10 January 2011 brought devastation to our area and affected me personally. Our agricultural farm at Grantham was totally inundated with the deluge with huge loss to my family - machinery and equipment and land. We all – my family, neighbours, the community –asked, “Why?” “What happened?” “How could this be?”

I knew nothing about disaster management or even who was responsible for doing what during and after such an event. Now, approximately nine months later, and as the wet season storms begin to fall, I can at least say I have just begun to understand the enormous area of disaster management.

The extent of this disaster activated a state disaster declaration and members of the Australian Defence Forces and other agencies were called in to assist local communities deal with the disaster. The events instigated the Queensland Floods Commission of Inquiry to investigate all aspects of disaster management. This project was a broad overview of the TRC disaster management process dealing specifically with repair of the road network system. As the event progressed from emergent to restorative,

management legislation and systems were being quickly up-dated to cope with the changing needs and as deficiencies were identified in the existing systems. Once updated or amended the “old system” was no longer available for perusal. However, once the system is improved, it is hoped that future studies will be able to access an up-dated and hopefully more stable set of legislation, guidelines, policies and procedures for disaster management.

Areas of study for future investigation could include:

- Analysis of how an asset management register would be affected by a disaster occurring in the area i.e. roads being reconstructed that are due for repair or roads that have been recently constructed and now have a reduced design life because of sub-grade saturation.
- Studies could be conducted into early warning systems on river systems.
- Studies regarding dam management as recommended by the QFCI.
- Studies into local community disaster management systems – systems where each community has its own disaster procedures so when communities become isolated they can look after themselves.
- Developing the software program to link a Geographic Information System, Customer Service database and the Central Mapping System.
- Disaster management training, community education and awareness are areas that need further investigation to ensure disaster preparedness.

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## **Appendix**

## Appendix A- Project Specification

### University of Southern Queensland ENG 4111/4112 Research Project Project Specifications

- FOR:** David Olm  
**TOPIC:** Management of Road Reconstruction and Repair following a Flooding Disaster (10 Jan 2011)
- SUPERVISORS:** Dr David Thorpe  
John Byrnes, TRC Assets Management Department
- ENROLLMENT:** ENG 4111 – S1 2011, External  
ENG 4112 – S2 2011, External
- PROJECT AIMS:** Analyse the TRC management response regarding reconstruction and repair of the Toowoomba District road network following a flooding disaster for both emergent and short term restoration efforts, and identifying issues present within the system.
- SPONSORSHIPS:** Toowoomba Regional Council (TRC)
- PROGRAMME:** Issue D , 20<sup>th</sup> May 2011
1. Undertake Literature Review of road maintenance and flooding disaster management
  2. Review effects of water on sealed roads, and repair methods
  3. Research TRC current policies and procedures in place to deal with road maintenance and flooding disasters.
  4. Analyse TRC emergency response, and systems, and short term restoration effort to repair road network
  5. Research Funding strategies of the NDRRA and QLD Reconstruction Authority
  6. Review emergency response of Lockyer Valley Regional Council subjected to similar flash flooding damage
  7. Analyse and evaluate research data with the view to identifying issues present in the current management systems
  8. Write and submit a dissertation to required standard

**Should Time Permit:**

9. Design improved management system with a view to improve the efficiency and effectiveness of the management systems

**AGREED:**

..... (Student)

...../...../.....

.....; ..... (Supervisors)

...../...../.....

...../...../.....

# Appendix B – Regional Demographic and Population Statistics 2006

**Demographic Characteristics for Urban Centres**

Characteristic	Carboora	Citron	Crow's Nest	Gower Junction	Hillpines	Kangaroo	Memorandum	Millicerra	Oakey	Pitsworth	Toowoomba	Westbrook	Wyerra	Yarraman	TRC	GOLD
Number of People	4,666	2,928	1,712	1,417	6,528	1,472	1,473	1,223	4,666	2,928	117,628	2,289	1,020	1,349	151,297	3,891,568
<b>Age Profile</b>																
Aged 0 to 4	8.4%	6.8%	5.3%	7.7%	8.3%	8.2%	9.1%	8.0%	7.4%	7.8%	6.6%	11.1%	10.9%	6.5%	6.9%	6.6%
Aged 5 to 14	20.1%	15.7%	11.6%	19.6%	19.8%	17.6%	21.1%	13.1%	16.4%	14.3%	14.0%	19.3%	19.5%	14.5%	15.1%	14.1%
Aged 15 to 24	12.1%	10.0%	7.1%	13.3%	10.6%	12.5%	9.2%	10.6%	13.0%	12.9%	16.3%	10.6%	13.0%	10.7%	14.5%	13.8%
Aged 25 to 44	30.1%	20.6%	18.6%	31.5%	26.6%	28.5%	31.7%	23.6%	25.8%	22.7%	24.9%	35.3%	32.8%	21.1%	25.2%	28.2%
Aged 45 to 64	21.9%	25.9%	26.4%	23.5%	24.9%	25.6%	22.6%	25.3%	22.6%	23.7%	23.2%	19.3%	18.4%	25.6%	24.4%	25.0%
Aged 65 to 74	5.9%	10.1%	15.1%	1.1%	6.1%	5.5%	4.1%	9.5%	7.8%	9.2%	7.3%	2.7%	4.5%	12.6%	7.1%	6.6%
Aged 75 and over	1.9%	11.2%	16.0%	1.0%	3.7%	1.8%	2.1%	9.9%	7.0%	9.3%	7.8%	1.5%	0.8%	9.1%	6.7%	5.7%
Median Age *	32	41	51	33	35	34	32	39	37	39	35	30	30	42	36	36
<b>Ethnicity and Cultural Diversity</b>																
Identifies as Indigenous	3.4%	3.6%	1.0%	2.1%	1.2%	4.3%	1.9%	3.9%	9.1%	2.5%	3.1%	2.7%	2.1%	3.1%	2.9%	3.3%
Born in Australia	91.7%	85.2%	86.3%	91.7%	86.8%	89.3%	87.1%	90.5%	87.3%	90.2%	84.3%	91.5%	91.5%	84.0%	85.6%	75.2%
Born elsewhere	5.5%	9.4%	9.8%	6.3%	9.5%	6.0%	9.4%	5.0%	6.0%	6.1%	10.1%	5.8%	6.9%	10.1%	9.1%	17.9%
Speaks only English at home	97.3%	92.6%	96.0%	97.2%	95.9%	95.3%	95.2%	96.1%	89.8%	95.4%	91.0%	96.7%	97.6%	94.3%	92.3%	88.4%
Speaks language other than English at home	1.2%	2.0%	2.4%	1.0%	1.6%	1.4%	1.6%	1.5%	2.3%	2.0%	4.4%	1.8%	0.7%	2.0%	3.4%	7.8%
<b>Household Composition and Income</b>																
Family households	80.1%	71.0%	67.9%	92.6%	90.1%	79.5%	85.7%	67.6%	75.8%	75.5%	68.2%	91.6%	87.7%	68.8%	72.6%	72.7%
Lone person households	16.1%	26.2%	29.7%	6.4%	8.9%	18.6%	11.8%	28.7%	20.7%	22.4%	27.4%	6.9%	9.9%	27.4%	23.0%	22.8%
Other households	1.8%	1.8%	2.4%	0.8%	1.0%	1.9%	1.0%	2.7%	3.5%	2.1%	4.5%	1.5%	2.4%	3.8%	3.6%	4.5%
Mean household size*	2.6	2.5	2.2	3.1	3.1	2.8	3.1	2.4	2.6	2.6	2.4	3.2	2.9	2.5	2.5	2.5
Household income under \$350 per week	13.9%	22.8%	27.7%	5.0%	6.5%	12.8%	5.7%	20.0%	17.2%	16.6%	18.1%	4.7%	6.2%	24.8%	16.8%	15.1%
Household income under \$500 per week	20.8%	31.7%	41.9%	9.1%	11.1%	19.6%	13.2%	28.5%	24.4%	24.1%	21.9%	8.9%	11.8%	38.6%	22.9%	20.6%
<b>Family Composition</b>																
Couples without children	31.9%	41.9%	50.3%	28.1%	37.3%	39.2%	37.5%	45.8%	39.9%	42.3%	39.8%	41.7%	41.3%	46.9%	39.8%	38.2%
Couples with children	48.3%	39.1%	30.4%	62.4%	56.0%	46.8%	53.0%	38.7%	38.1%	43.9%	40.9%	62.0%	54.1%	38.3%	43.7%	43.3%
One parent families	18.5%	16.6%	18.1%	8.3%	6.5%	13.0%	8.8%	13.0%	20.9%	12.7%	17.3%	6.3%	13.3%	12.9%	14.9%	15.9%
Other families	1.3%	2.4%	1.3%	1.2%	0.2%	0.9%	0.7%	2.5%	1.2%	1.1%	2.0%	0.0%	1.4%	2.0%	1.6%	1.7%
<b>Highest level of schooling</b>																
Year 12 or equivalent	31.6%	27.6%	25.9%	47.7%	46.7%	38.2%	39.1%	24.8%	21.5%	28.9%	42.8%	40.5%	38.2%	22.7%	40.2%	43.9%
Year 10 or equivalent	37.4%	36.7%	34.6%	34.4%	33.2%	43.9%	38.0%	40.8%	36.7%	37.9%	31.2%	40.1%	38.9%	36.9%	31.2%	28.9%
Year 8 or below	12.0%	16.3%	25.5%	5.5%	6.3%	10.9%	6.0%	19.4%	17.1%	17.8%	11.1%	4.8%	8.1%	18.0%	11.4%	8.2%
Did not go to school	0.0%	0.9%	0.9%	0.4%	0.2%	0.7%	0.1%	0.0%	0.9%	0.0%	0.6%	0.0%	0.0%	1.4%	0.5%	0.5%
<b>Other Characteristics</b>																
People reaching assistance with core activities	4.2%	10.4%	12.0%	1.9%	2.4%	4.1%	3.1%	6.4%	8.3%	5.3%	5.3%	1.7%	2.1%	8.7%	4.9%	4.2%
Males undertaking volunteer work	7.0%	11.3%	12.6%	10.4%	11.6%	7.0%	9.1%	10.9%	7.7%	10.9%	6.6%	8.0%	5.8%	11.4%	10.2%	8.4%
Females undertaking volunteer work	12.1%	17.3%	18.7%	13.0%	15.6%	11.2%	11.9%	15.4%	12.6%	16.4%	13.5%	10.6%	10.5%	16.0%	14.1%	11.9%
People undertaking volunteer work	19.1%	28.6%	31.3%	23.4%	27.2%	18.2%	21.0%	26.2%	20.3%	27.3%	21.1%	18.7%	16.2%	27.5%	24.3%	20.3%
Dwellings with an internet connection	62.7%	48.8%	43.9%	74.1%	78.7%	61.7%	72.2%	41.1%	49.1%	47.4%	58.0%	77.4%	65.5%	42.7%	59.2%	64.8%
Dwellings with no motor vehicle	3.9%	9.1%	10.3%	0.0%	1.4%	0.6%	1.3%	9.5%	8.4%	6.6%	10.0%	2.0%	0.0%	10.6%	7.8%	8.1%
Dwellings with one or more motor vehicles	96.1%	90.9%	89.7%	100.0%	98.6%	99.4%	98.7%	90.5%	91.6%	93.4%	90.0%	98.0%	100.0%	89.4%	92.2%	91.8%

Source: ABS Basic Community Profile, Toowoomba Regional Council, Regional Strategic Sport and Recreation Plan, Ross Planning

**Figure 31 TRC Demographic Population Statistics**  
(Sourced: Regional Demographic and Population Statistics 2006)

## Appendix C – Radar Image of Storm Cell during 10 January 2011



Figure 32 Radar Image 1

(Sourced: BOM 2011)



Figure 33 Radar Image 2

(Sourced: BOM 2011)





Figure 34 Radar Image 3

(Sourced: BOM 2011)



Figure 35 Radar Image 4

(Sourced: BOM 2011)

## Appendix D – Extracts of Disaster Management Act 2003

Note: The following extracts are presented to bring the reader’s attention to particular sections of the Acts relevant to the project. The extracts are not intended to be interpreted in isolation of the full document. The true meaning of the Act can only be gauged by reading the Act in its entirety.

- 57 Plan for disaster management in local government area**
- (1) A local government must prepare a plan (a *local disaster management plan*) for disaster management in the local government’s area.
  - (2) The plan must include provision for the following—
    - (a) the State group’s strategic policy framework for disaster management for the State, and the local government’s policies for disaster management;
    - (b) the roles and responsibilities of entities involved in disaster operations and disaster management in the area;
    - (c) the coordination of disaster operations and activities relating to disaster management performed by the entities mentioned in paragraph (b);
    - (d) events that are likely to happen in the area;
    - (e) strategies and priorities for disaster management for the area;
    - (f) the matters stated in the disaster management guidelines as matters to be included in the plan;
    - (g) other matters about disaster management in the area the local government considers appropriate.

**Figure 36 Disaster Management Act 2003 Section 57 (1)**

(Sourced: Disaster Management Act 2003)

- 59 Reviewing and renewing plan**
- (1) A local government may review, or renew, its local disaster management plan when the local government considers it appropriate.
  - (2) However, the local government must review the effectiveness of the plan at least once a year.

**Figure 37 Disaster Management Plan Section 59**

(Sourced: Disaster Management Act 2003)

**76 General provision about powers**

- (1) A relevant district disaster coordinator, or a declared disaster officer, for the disaster situation has the powers given under this subdivision.
- (2) However, a relevant district disaster coordinator or a declared disaster officer may exercise a power only—
  - (a) during the period of the disaster situation; and
  - (b) to do any of the following—
    - (i) ensure public safety or public order;
    - (ii) prevent or minimise loss of human life, or illness or injury to humans or animals;
    - (iii) prevent or minimise property loss or damage, or damage to the environment;
    - (iv) otherwise prepare for, respond to, or recover from, the disaster situation.

**Figure 38 Disaster Management Act 2003 Section 76 (1) (2)**

(Sourced: Disaster Management Act 2003)

## 77 General powers

- (1) A relevant district disaster coordinator or a declared disaster officer may do all of the following—
  - (a) control the movement of persons, animals or vehicles within, into, out of or around the declared area for the disaster situation;
  - (b) give a direction to a person to regulate the movement of the person, an animal or a vehicle within, into, out of or around the declared area;
  - (c) evacuate persons or animals from the declared area or a part of the area;
  - (d) enter a place in the declared area;
  - (e) take into a place in the declared area the equipment, persons or materials the officer reasonably requires for exercising a power under this subdivision;
  - (f) contain an animal or substance within the declared area;
  - (g) remove or destroy an animal, vegetation or substance within the declared area;
  - (h) remove, dismantle, demolish or destroy a vehicle, or a building or other structure, in the declared area;
  - (i) use, close off or block a facility for drainage;
  - (j) shut off or disconnect a supply of fuel, gas, electricity or water, and take and use the fuel, gas, electricity or water;
  - (k) turn off, disconnect or shut down any motor or equipment;
  - (l) open a container or other thing, or dismantle equipment;
  - (m) excavate land or form tunnels;
  - (n) build earthworks or temporary structures, or erect barriers;
  - (o) close to traffic any road;
  - (p) maintain, restore, or prevent destruction of, essential services;
  
  - (q) require a person to give the relevant district disaster coordinator or declared disaster officer reasonable help to exercise the coordinator's or officer's powers under this subdivision.

**Figure 39 Disaster Management Act 2003 Section 77 (1)**

(Sourced: Disaster Management Act 2003)

## Part 5

## Functions of local governments

### 80 Functions of local government

- (1) The functions of a local government under this Act are as follows—
  - (a) to ensure it has a disaster response capability;
  - (b) to approve its local disaster management plan prepared under part 3;
  - (c) to ensure information about an event or a disaster in its area is promptly given to the district disaster coordinator for the disaster district in which its area is situated;
  - (d) to perform other functions given to the local government under this Act.
- (2) In this section—

*disaster response capability*, for a local government, means the ability to provide equipment and a suitable number of persons, using the resources available to the local government, to effectively deal with, or help another entity to deal with, an emergency situation or a disaster in the local government's area.

**Figure 40 Disaster Management Act 2003 Section 80 (2)**

(Sourced: Disaster Management Act 2003)

## **Appendix E – Extracts of Local Government Act 2009**

Note: The following extracts are presented to bring the reader's attention to particular sections of the Acts relevant to the project. The extracts are not intended to be interpreted in isolation of the full document. The true meaning of the Act can only be gauged by reading the Act in its entirety.

### **8 Local government's responsibility for local government areas**

- (1) A *local government* is an elected body that is responsible for the good rule and local government of a part of Queensland.

*Note—*

This is provided for in the *Constitution of Queensland 2001*, section 71 (Requirements for a local government).

**Figure 41 Local Government Act 2009 Section 8 (1)**

(Sourced: Local Government Act 2009)

### **9 Powers of local governments generally**

- (1) A local government has the power to do anything that is necessary or convenient for the good rule and local government of its local government area.

**Figure 42 Local Government Act 2009 Section 9 (1)**

(Sourced: Local Government Act 2009)

### **13 Responsibilities of local government employees**

- (1) All employees of a local government have the same responsibilities, but the chief executive officer has some extra responsibilities.
- (2) All employees have the following responsibilities—
  - (a) implementing the policies and priorities of the local government in a way that promotes—
    - (i) the effective, efficient and economical management of public resources; and
    - (ii) excellence in service delivery; and
    - (iii) continual improvement;
  - (b) carrying out their duties in a way that ensures the local government—
    - (i) discharges its responsibilities under this Act; and
    - (ii) complies with all laws that apply to local governments; and
    - (iii) achieves its corporate and community plans;

**Figure 43 Local Government Act 2009 Section 13 (1) (2)**

(Sourced: Local Government Act 2009)

### **60 Control of roads**

- (1) A local government has control of all roads in its local government area.
- (2) This control includes being able to—
  - (a) survey and resurvey roads; and
  - (b) construct, maintain and improve roads; and
  - (c) approve the naming and numbering of private roads; and
  - (d) name and number other roads; and

**Figure 44 Local Government Act 2009 Section 60 (1) (2)**

(Sourced: Local Government Act 2009)

### **69 Closing roads**

- (1) A local government may close a road (permanently or temporarily) to traffic or particular traffic, if there is another road or route reasonably available for use by the traffic.
- (2) Also, the local government may close a road to traffic—
  - (a) during a temporary obstruction to traffic; or
  - (b) if it is in the interests of public safety; or
  - (c) if it is necessary or desirable to close the road for a temporary purpose (including a fair, for example).

**Figure 45 Local Government Act 2009 Section 69 (1) (2)**

(Sourced: Local Government Act 2009)

## **Appendix F – Queensland Reconstruction Authority Act 2011**

Note: The following extracts are presented to bring the reader's attention to particular sections of the Acts relevant to the project. The extracts are not intended to be interpreted in isolation of the full document. The true meaning of the Act can only be gauged by reading the Act in its entirety.

### **2 Main purpose of Act**

The main purpose of this Act is to provide for appropriate measures to ensure Queensland and its communities effectively and efficiently recover from the impacts of disaster events.

**Figure 46** Queensland Reconstruction Authority Act 2011 Section 2

(Sourced: Queensland Reconstruction Authority Act 2011)

### **6 Meaning of *disaster event***

*Disaster event* means any of the following—


- (a) the floods caused by heavy rains in December 2010 and January 2011;
- (b) severe tropical cyclone Yasi;
- (c) another disaster, within the meaning of the *Disaster Management Act 2003*, prescribed under a regulation.

**Figure 47** Queensland Reconstruction Act 2011 Section 6

(Sourced: Queensland Reconstruction Authority Act 2011)



## Appendix G – Disaster Coordination Centre Forms



**TOOWOOMBA  
REGIONAL  
COUNCIL**

**TRC Disaster Coordination Centre  
Message Form**

**ANNEX O  
To TRC DCC SOP**

Date: \_\_\_/\_\_\_/\_\_\_ Time: \_\_\_\_\_ hrs Log No. \_\_\_\_\_

URGENT / ROUTINE

**FROM:**  
NAME: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

PHONE / FAX NO. \_\_\_\_\_

**MESSAGE / REQUEST:** (if fax message, pin copy to rear of this form)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Signature of Recipient

**ACTION:**

URGENT / ROUTINE

INTEL	QPS	QAS	QFRA	SES	MEDIA	TRANSPORT
TELSTRA	POWER	MEDICAL	COUNCIL	Q RAIL	EXEC OFFICER	

OTHER AGENCY (Specify) \_\_\_\_\_

INCLUDE IN SITREP YES / NO \_\_\_\_\_ Signature of Tasking Officer \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE & TIME COMPLETED: \_\_\_/\_\_\_/\_\_\_ \_\_\_\_\_ hrs

\_\_\_\_\_  
Signature of Liaison Officer

**Figure 48 TRC Disaster Coordination Centre Message Form**

(Sourced: SOP 2011)



**TOOWOOMBA REGIONAL COUNCIL  
DISASTER COORDINATION CENTRE  
REQUEST FOR ASSISTANCE FORM (MANUAL)**

Request Number  
DCC **1701**

**REQUEST RECEIVED**

Date  Time  Operator

**INCIDENT LOCATION**

Building/Property Name

Unit No/Street No  Street

Suburb  Postcode  Map Ref

Nearest Cross Street

Occupant's Name

Contact Number  Alt Contact Number

**Occupant Type**

Residential  Aged/Infirm  Critical Facility  Commercial

**Status**

Owner  Renting  Govt Housing

**Other**

Language

**Reported By**

Resident  Neighbour  SES  Police  Other (state)

(Fill in only if reported by non-resident)

Name

Contact Number

Called Before

**JOB DETAILS**  Rescue Required  No Trapped  No Injured

Type

**Job Type**

Tree Down  Tree Threatening  Roof Damage  Window Damage  Door Damage  Flood Threatening  Flooded  Subsidence  Re - tarp  Other  Type

**Structure**

House  No of storeys  Road  Pool (ABG)  Garage  Yard  Type  Bridge

**Type of Roof**

Tiles  Metal  Fibro  Slate

**Rooms Affected**

Bedroom  Kitchen  Living/dining

**Job Type**

Power lines to premise threatened  Power lines to street threatened  Power lines to premises down  Power lines on street down  Burst Water  Burst Sewer  Burst Gas  Blocked street drain  Fibro/Asbestos Dust/Debris

Access to Property

Additional Information

**OPERATIONS**

REFER TO or  POLICE  QFRS  QAS  SES  LDMG  RFS  TELSTRA  ABC  TRC  ERGON  ELGAS  EMQ

Allocation by DCC  Time Notified  Time Completed

**Figure 49 Manual Request for Assistance Form - Page 1 of 2**

(Sourced: SOP 2011)

**REQUEST RESPONSE**

Request Received from DCC Ops  Name of Receiving Office  Time Received

Action Taken  YES  NO

Request Noted in OPS Log

DCC OPS Advised  YES  NO

Time DCC OPS Advised

**REQUEST COMPLETION**

Task Completed  YES  NO (If No what is expected time of completion?)

Has DCC OPS been advised of task status?  YES  NO

Is the original Request Form (white copy) filed on the OPS assistance for request file?  YES  NO

Is the OPS Copy (green copy) filed on the OPS assistance for request file?  YES  NO

Is the Action Agency copy (yellow copy) filed on the OPS assistance for request file?  YES  NO

Are the task request and its situation recorded on the OPS Status Board/OPS Computer?  YES  NO

Has the task status been recorded in a SITREP?  YES  NO

Has the task request been recorded into the TRC Pathway system?  YES  NO

**Sign Off by DCC Duty Officer**

Comment

Name  Date  Time

Duty Officer Signature

**Figure 50 Manual Request for Assistance Form - Page 2 of 2**

(Sourced: SOP 2011)

## **Appendix H – Queensland Reconstruction Authority Claim**

### **Submission forms**

The following Figures 51, 52, 53, 54, 55, 57 and 57 illustrate some of the submission forms required for funding applications under the NDRRA program: a submission checklist, specific site submission, unit rates for multi site submission, multi site submission, summary sheet, and a Value for Money (VfM) statement. Please note additional information is required regarding day labour component for a number of forms. As of April 2010 day labour rates were ineligible for funding however recent information suggests that labour might be claimable so should be recorded. (NDRRA Guidelines)

# Queensland Reconstruction Authority

## Natural Disaster Relief and Recovery Arrangements Restoration of essential public assets

Form 1

**This form must be completed and submitted with the Applicant's NDRRA submission**

### Submission Checklist

<input type="checkbox"/>	Complete (☑) all relevant 'Restoration of essential public assets' application forms to enable a full assessment of your submission. <ul style="list-style-type: none"> <li><input type="checkbox"/> Form 1 – Submission Checklist</li> <li><input type="checkbox"/> Form 2 – Specific sites submission (including representative photos illustrating damage)</li> <li><input type="checkbox"/> Form 3 – Unit rates for multi sites, one project submission</li> <li><input type="checkbox"/> Form 4 – Multi sites, one project submission (including representative photos illustrating damage)</li> <li><input type="checkbox"/> Form 5 – Summary Sheet</li> <li><input type="checkbox"/> Form 6 – VIM Statement</li> </ul>
<input type="checkbox"/>	All costings exclude GST
<input type="checkbox"/>	Relevant application forms have been signed by BOTH the estimator and accountable officer.
<input type="checkbox"/>	Map, chainage and GPS coordinates identifying location of damaged assets in relation to source/s of damage is included in your submission.
<input type="checkbox"/>	Hard and electronic copies of your photos are included with your submission.
<input type="checkbox"/>	Submissions must be emailed with following information in the 'Subject' field: Applicant Name - Submission Type (Emergent/Restoration Work) - Your Reference Number (if applicable) (e.g. ABC Council - Emergent Work - EW-LAS06)
<input type="checkbox"/>	Name of contact officer for your submission: Name: _____ Position: _____ Phone: _____ Email: _____

Name .....

Applicant .....

Signature - Chief Executive Officer /  
Accountable Officer .....

Date .....

Return Forms 1-6 to the Queensland Reconstruction Authority as listed in the Submission Guide

This information is being collected for the purposes of funding, management and reporting of reconstruction activities. This information is collected pursuant to Part 2, Division 2 of the Queensland Reconstruction Authority Act 2011. The information may be disclosed to the Commonwealth Government and Qld Government agencies, departments and statutory authorities involved with reconstruction activities.

#### Where do I get help?

Any queries regarding your submission should be directed to [submissions@qdra.org.au](mailto:submissions@qdra.org.au).

Level 9, 119 Charlotte Street Brisbane  
PO Box 15428 City East  
Queensland 4002 Australia  
Telephone +61 7 3008 7200  
Facsimile +61 7 3008 7299  
[www.qdreconstruction.org.au](http://www.qdreconstruction.org.au)

Figure 51 Submission Form 1 - Submission Check List

(Sourced: QRA Submission Guide)



Asset Number: \_\_\_\_\_ ●

Site : \_\_\_\_\_ ●

INSERT PHOTO BELOW



**Figure 53 Submission Form 2 - Photo Reference**

(Sourced: QRA Submission Guide)

NDRRA Event:

Agency / Local Government Area

Please tick
Submission Type: Emergent work, Restoration work
Actuals / Estimates: Actuals, Estimates

Activity Description: Insert a CLEAR and comprehensive description of the proposed/completed restoration on the site, including Engineering Standards / Building Codes.

Table with 6 columns: Reference, Labour / Plant, Unit, Quantity, Rate, Value (excl GST). Includes a total row at the bottom with values \$0.00.

We certify that the proposed/completed restoration works are required as a result of an activated natural disaster event and complies with Submission Guide and Queensland Disaster Relief and Recovery Arrangements.

Estimator: Signature: Date:
Accountable Officer: Signature: Date:

This information is being collected for the purposes of funding, management and reporting of reconstruction activities. This information is collected pursuant to Part 2, Division 2 of the Queensland Reconstruction Authority Act 2011.

Figure 54 Submission Form 3 – Unit Rates for Multi Site Submission

(Sourced: QRA Submission Guide)







Value for Money Statement		FORM 6
NDRRA Event:		
Agency / Local Government Area		
PART A: VFM Readiness Statement		
Resourcing:	<i>Project/Construction Management Plan. What is the proposed approach and resources to manage the projects? (in-house or external)</i>	
Procedures and Processes (procurement and probity):	<i>Procurement Strategy / Plan. What procedures and processes have been established to manage the projects in a manner that will support the achievement of VFM outcomes? Probity Plan. What procedures and processes have been established to ensure that full accountability and probity will be achieved in the procurement of the project.</i>	
Track Record:	<i>List of relevant projects. What experience does the applicant organisation have in delivering projects of this nature?</i>	
PART B: Project VFM Statement		
VALUE OBJECTIVES		
Project Objective:	<i>How the objectives are consistent with the key strategic milestones and the Lines of Reconstruction priorities described in the State Plan. (Section five and section six of Operation Queensland – The State Community, Economic and Environmental Recovery and Reconstruction Plan 2011-2013 - access at <a href="http://www.qldreconstruction.org.au/state-plan">http://www.qldreconstruction.org.au/state-plan</a>)</i>	
Competitive Tendering:	<i>What is your proposed tender method? What competitive tension was present in developing the cost estimates? If direct or panel appointment is proposed, what mitigation strategies were utilised to assure VFM? (e.g. appropriate cost benchmarks used to assess reasonableness of cost estimates?)</i>	
Contract Terms:	<i>What type of contract do you propose to use (e.g. Australian Standard) Are any special conditions, including allocation of risk, proposed to be used?</i>	
Program:	<i>Planned start, duration and completion dates. Project Milestones If the proposed project is intended to meet particularly urgent objectives If any public commitments have been made about the project/s? If the project has been subject of engagement with the community</i>	
Whole of Life Considerations:	<i>How whole of life considerations have contributed to the selection of the preferred project options</i>	
Capability / Capacity: <i>Refer to Form 6, Attachment</i>	<i>Updated list of projects including current/ approved projects, and projects to be undertaken by the applicant (revised with updated estimates as required).</i>	
Local Industry Participation:	<i>Details of how local participation policy expectations have been met (consideration during procurement process of local contractors or workforce)</i>	
COST OBJECTIVES		
Cost:	<i>Forecast outturn cost of the project (from Forms 2-5)</i>	
Benchmarks:	<i>Detail of appropriate cost benchmarks used to assess the reasonableness of cost estimates</i>	
OTHER OBJECTIVES		
Workforce:	<i>Overview of the project workforce, including full-time equivalents, Indigenous Australians, trainees and women</i>	
<p>We certify that the proposed/completed restoration works are required as a result of an activated natural disaster event and complies with Submission Guide and Queensland Disaster Relief and Recovery Arrangements. We certify that the photographs supplied are a true and accurate record of the damage sustained to the asset at the specified location(s). We certify that no ordinary wages/salaries have been included in this submission, nor any other costs that are ineligible under the NDRRA arrangements. We certify that funding approved will only be used for the specified restoration for this site(s). We certify that the CEO and/or accountable officer has cited all supporting documentation and it is a true and accurate record of the damage sustained to the asset at the specified location(s). We certify that all the amounts claimed are exclusive of GST.</p>		
Contact Officer: _____	Signature: _____	Date: ____/____/____
Accountable Officer: _____	Signature: _____	Date: ____/____/____
<small>This information is being collected for the purposes of funding, management and reporting of reconstruction activities. This information is collected pursuant to Part 2, Division 2 of the Queensland Reconstruction Authority Act 2011. The information may be disclosed to the Commonwealth Government and Qld Government agencies, departments and statutory authorities involved with reconstruction activities.</small>		

**Figure 57 Submission Form 6 - Value for Money Statement**

(Sourced: QRA Submission Guide)

## **Appendix I – Ethics, Consequential Effects and Safety**

### **Ethics and Consequential Effects**

#### **Introduction**

This chapter will discuss the consequential effects that any engineering works will have on the environment and the ethical issues that engineers must consider. Safety issues and workplace health and safety is an essential part of any engineering project that must be considered and will be discussed.

#### **Consequences**

Consequences of any engineering project have to be considered. A document entitled ‘Towards sustainable engineering practice: engineering frameworks for sustainability’ has been published by the Institution of Engineers, Canberra, Australia, 1997. Ten aspects of sustainability have been identified as a benchmark with which to measure any engineering project with regard to sustainability. These ten aspects of sustainability and consequences have been listed with relevant responses. The TRC has active environmental protection procedures and policies and all employees are instructed regarding the requirements.

*1. Development today should not undermine the development and environmental needs of future generations.*

- Road repair and restoration will have an effect into the future, but will make the road network systems safer for future generations.

*2. Environment protection shall constitute an integral part of the development process.*

- The TRC has active environmental protection procedures and policies. All employees are instructed regarding the requirements. Road repair will be conducted within the confines of best practise for environmental purposes.
- This project involves repair and restoration of existing infrastructure. When these assets were constructed they would have been the subject of environmental impact studies.

*3. Engineering (and surveying) people should take into consideration the global environmental impacts of local actions and policies.*

- Repairing and restoring road network systems to a serviceable condition is integral to the communities well-being. Better road systems would increase the efficiency of travel and reduce wear and tear maintenance on vehicles which has a global effect on use of resources.

- Better road network systems provide better national transport systems and improves local and national economies.

*4.The precautionary approach should be taken – scientific uncertainty should not be used to postpone measures to prevent environmental degradation.*

- This project is concerned with road maintenance of existing infrastructure using approved methods.
- Documents such as Design Guidelines Transport Network Reconstruction Program issued by the Transport and Main Roads, and AustRoads, Queensland Government are in place to provide guidelines of policies and procedures.

*5.Environmental issues should be handled with the participation of all concerned citizens.*

- Toowoomba is a regional gateway within Queensland. It is within the national interest to repair and maintain the road network system.
- All stakeholders are informed of plans and progress via newspapers, websites, television, radio, brochures and Government, including Council, documents, press conferences and announcements.
- At this stage of the project the interested parties are project supervisor USQ, associate supervisor TRC and contact is maintained by face to face meeting, email and report.

*6.The community has a right of access to, and an understanding of, environmental information.*

- An environmental discussion will be clearly described and reported on in the dissertation.

*7.The polluter should bear the cost of pollution and so environmental costs should be internalised by adding them to the cost of production.*

- TRC is an active participant of implementing Environmental Management Systems and an Environmental Management System steering Committee was formed to implement Regional Environmental Management Systems.
- The 2009/2010 Annual Report has identified percentages regarding the impact their activities have on the environment. Road repair and restoration is one of the lower contributors to carbon emissions.

*8.The eradication of poverty, the reduction in differences in living standards and the full participation of women, youth and indigenous people are essential to achieve sustainability.*

- Repair and restoration of road network systems connects communities and provides better and more efficient access to the larger cities where employment, health care, education and other facilities are available.

*9. People in developed countries bear a special responsibility to assist in the achievement of sustainability.*

- Developing countries are unlikely to have the same governing systems as are found in an Australian local council.
- Laws regarding sustainability and environmental protection within Australia are developed with a view to protecting and preserving the environment and laws like this may not be so in other countries.
- The analysis of the management system is specific to TRC and the exact issues may not apply to other areas. This project may not have an application in developing countries.

*10. Warfare is inherently destructive of sustainability, and, in contrast, peace, development and environmental protection are interdependent and indivisible.*

- Improved road network systems improve the economy and therefore the living standards of the inhabitants.
- Better roads encourage interstate and international visitors to the area and this expands our connection to and understanding of other communities and people.

(Greene & Connors 1997)

### **Ethics**

The Engineers Australia 'Code of Ethics' provides ethical standards and requirements regarding the ethical responsibility that engineers have when undertaking their work. Engineers must adhere to this Code or risk disciplinary action. The Code of Ethics defines values and principles and the Guidelines on Professional Conduct details a framework of tenets for engineers to use. The main points included in the Code of Ethics are to demonstrate integrity, practise competently, exercise leadership and to promote sustainability. The Guidelines repeat each point and expand the meaning and implication of each point. It is the responsibility of an engineer to be aware of these standards and to act accordingly.

(Engineers Australia 2010)

### **Safety issues**

With any engineering project a risk assessment must be done. All activities involve some risk. This will involve identification of any potential hazards that may cause

physical damage to people or property i.e. personal safety and public safety. In Queensland the Workplace Health and Safety Act 1995 (other states have comparable acts) is the legislation under which risk management is governed. The concept of this Act is to establish a duty of care for each and every individual in the work place, which puts the onus of safety onto everyone. Employers and employees both have a duty of care in the workplace to take all reasonable precautions to maintain a safe workplace and that best practice systems are put in place to maintain safety.

There are two steps of managing risk - risk assessment and risk management (the subject of Risk management is beyond the scope of this course). Risk assessment is a process designed to mitigate or minimise risks. Risk is due to a hazard being present e.g. a Rotating PTO, stapler, a guillotine, photo copier emitting fumes. A hazard is something that can cause harm. The hazard, and risk must be identified evaluated and controlled.